PARTS LIST &
CIRCUIT DIAGRAMS

FISHER

FVH-P450S

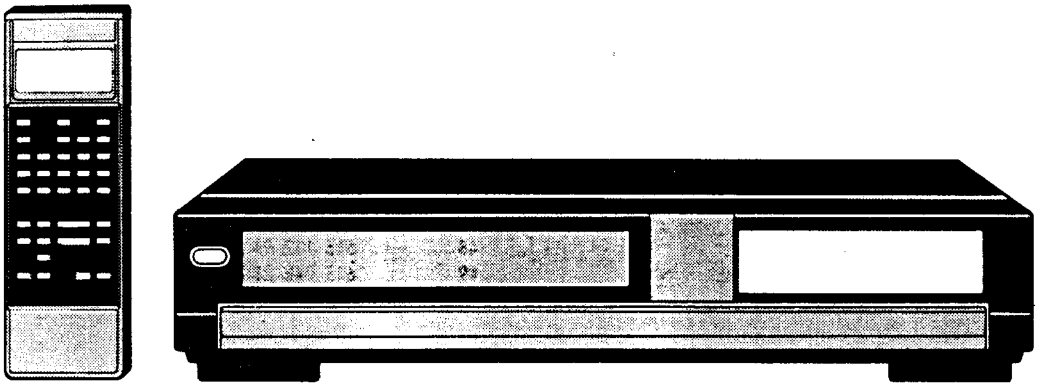
(Europe & Spain)

VIDEO
CASSETTE RECORDER

Please see other materials with Reference No. given in table below.

Materials	Model No.	Reference No.
SERVICE MANUAL	FVH-P450 Series	WM-530734
MECHANISM MANUAL	P90 MECHANISM	WM-530598

VHS PAL HQ



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CIRCUIT DIAGRAM

PRODUCT SAFETY NOTICE

The components designated by a symbol (⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the Parts List. Do not deviate from the resistance wattage and voltage rating shown.

NOTE: 1. Parts order must contain Model Number, Parts Number and Description.
2. N.S.P.: Not available as service parts.

LP2H/EXF 143 125 84
LP2H/SPF 143 130 55

REFERENCE No. WM-530736

ACCESSORIES

LOCATION	PARTS NO.	DESCRIPTION
	613 112 7111	REMOCON
	613 112 9849	INSTRUCTION MANUAL(EUROPE)
OR	613 116 8305	INSTRUCTION MANUAL(SPAIN)
	613 096 6773	CABLE,ANT
	613 064 7269	GUARANTEE CARD

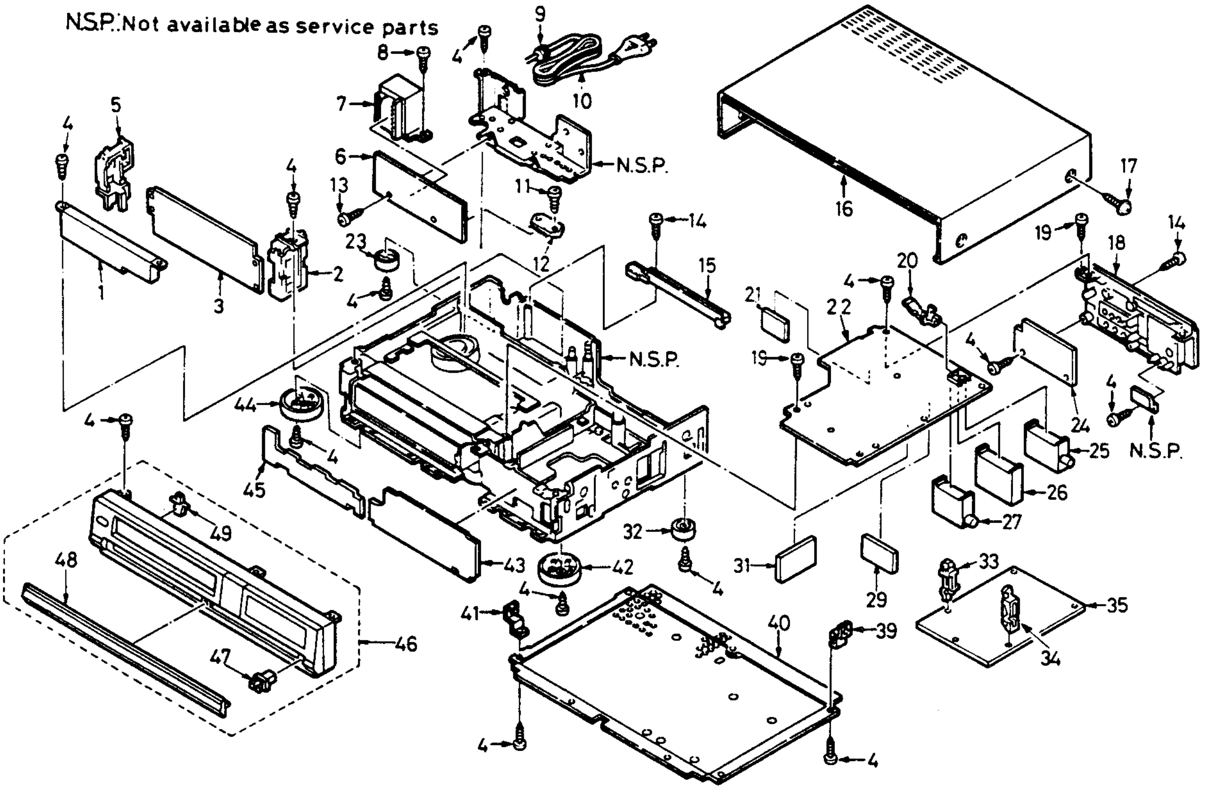
PACKING MATERIALS

LOCATION	PARTS NO.	DESCRIPTION
	613 110 7526	CORR CASE,INNER(EUROPE)
OR	613 112 9818	CORR CASE,INNER(SPAIN)
	613 117 4894	CUSHION,INNER,FRONT
	613 113 2740	CUSHION,INNER,BACK
	613 095 1229	POLYE COVER,INNER
	613 107 8970	BAR CODE LABEL

CABINET & CHASSIS PARTS

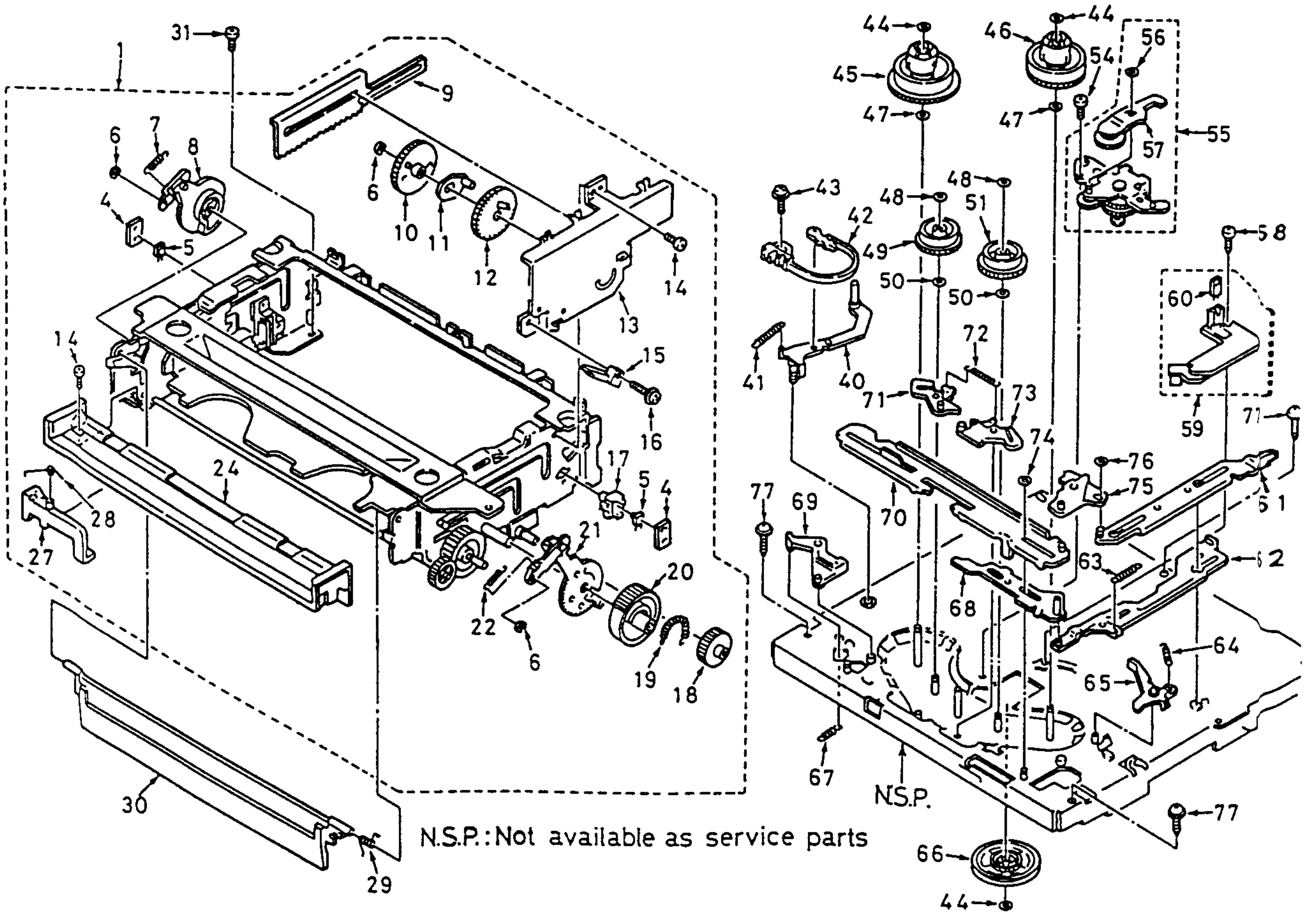
LOCATION		PARTS NO.	DESCRIPTION
1		613 111 9741	COMPL,VP-1
2		613 079 9708	HOLDER(INCLUDE TN-5)
3		613 097 9070	COMPL,TN-5
4		411 137 0007	SCR L-TPG BIN 3X10
5		613 079 9692	HOLDER(INCLUDE TN-5)
6		613 111 8898	COMPL,PW-1
7	⚠	613 112 7418	TRANS,POWER,T5001
8		411 021 9604	SCR S-TPG BIN 4X8
9	⚠	613 053 6686	FIXER
10	⚠	613 086 0507	CORD,POWER
OR	⚠	613 086 2150	CORD,POWER
11		411 021 4302	SCR S-TPG BIN 3X14
12		409 214 8909	IC511,STK7576(INCLUDE PW-1)
13		411 021 6405	SCR S-TPG BIN 3X8
14		411 021 3701	SCR S-TPG BIN 3X10
15		613 077 3487	BLIND
16		613 078 9624	COVER,TOP
17		412 024 7604	SPECIAL SCREW
18		613 097 3351	TERMINAL(INCLUDE CP-A)
19		411 021 3800	SCR S-TPG BIN 3X10
20		613 059 4198	SPRING PLATE
21		613 108 4186	COMPL,VD-1
22		613 112 3472	COMPL,CP-A(EUROPE)
OR		613 116 7858	COMPL,CP-A(SPAIN)
23		613 085 4902	STAND,BACK LEFT
24		613 111 8829	COMPL,TB-1
25		613 080 5836	MODULATOR,RF
OR		613 093 2990	MODULATOR,RF
26		613 112 4585	IF PACK
27		613 107 9403	TUNER PACK
29		613 109 4420	COMPL,TN-7
31		613 111 8836	COMPL,AD-1
32		613 088 1298	STAND,BACK RIGHT
33		613 094 7710	HOLDER(INCLUDE CP-A)
34		613 094 7727	HOLDER(INCLUDE CP-A)
35		613 110 7915	COMPL,CP-2
39		613 048 6912	BRACKET
40		613 081 5217	COVER,BOTTOM
41		613 022 0738	BRACKET,CABINET
42		613 117 7086	ASSY,STAND,FRONT RIGHT
43		613 116 6349	COMPL,TM-1
44		613 117 7031	ASSY,STAND,FRONT LEFT
45		613 112 3625	COMPL,TM-2
46		613 113 0289	COMPL,CABINET,FRONT
47		613 053 7638	FIXER
48		613 112 9443	DOOR
49		613 048 2884	LOCK

N.S.P.:Not available as service parts



LOCATION	PARTS NO.	DESCRIPTION
MECHANISM PARTS 1		
1	613 087 4412	COMPL,CASSETTE MECHA
4	613 022 0585	LID
5	407 098 3201	PHOTO COUPLE PN150SAN
6	411 015 9801	RING E 2.3
7	613 022 1643	SPRING,LINK L
8	613 022 0073	ASSY,GEAR,LEVER L
9	613 022 2695	RACK
10	613 022 2633	GEAR,LOCK
11	613 021 9916	ASSY,LEVER,PINION
12	613 022 2626	GEAR,PINION
13	613 021 9657	ASSY,BRACKET,GEAR
14	411 027 1305	SCR S-TPG BIN 2.6×4
15	613 006 4479	SPECIAL SWITCH
OR	613 095 0949	SPECIAL SWITCH
16	411 106 9208	SCR PAN+SW+W 2×9
17	613 022 0936	HOLDER,TRANSISTOR
18	613 022 2619	GEAR,IDLER
19	613 022 1667	SPRING,GEAR MAIN
20	613 022 2596	GEAR,MAIN
21	613 022 0097	ASSY,GEAR,LEVER R
22	613 022 1674	SPRING,LINK R
24	613 022 4064	BOARD,UNDER
27	613 022 2237	LEVER,SAFETY SWITCH
28	613 022 1827	SPRING,SAFETY SWITCH
29	613 022 1803	SPRING,DOOR
30	613 109 0415	CASSETTE DOOR
31	411 001 8702	SCR BIN 3×6
40	613 100 0391	ASSY,LEVER,TENSION
41	613 085 7996	SPRING,LEVER TENSION
42	613 021 9701	ASSY,HOLDER,BAND
43	411 036 2805	SCR PAN+SW+W 2.6×6
44	411 109 1605	WASHER Y 2.6×6×0.25
45	613 022 0127	ASSY,REEL,SUPPLY

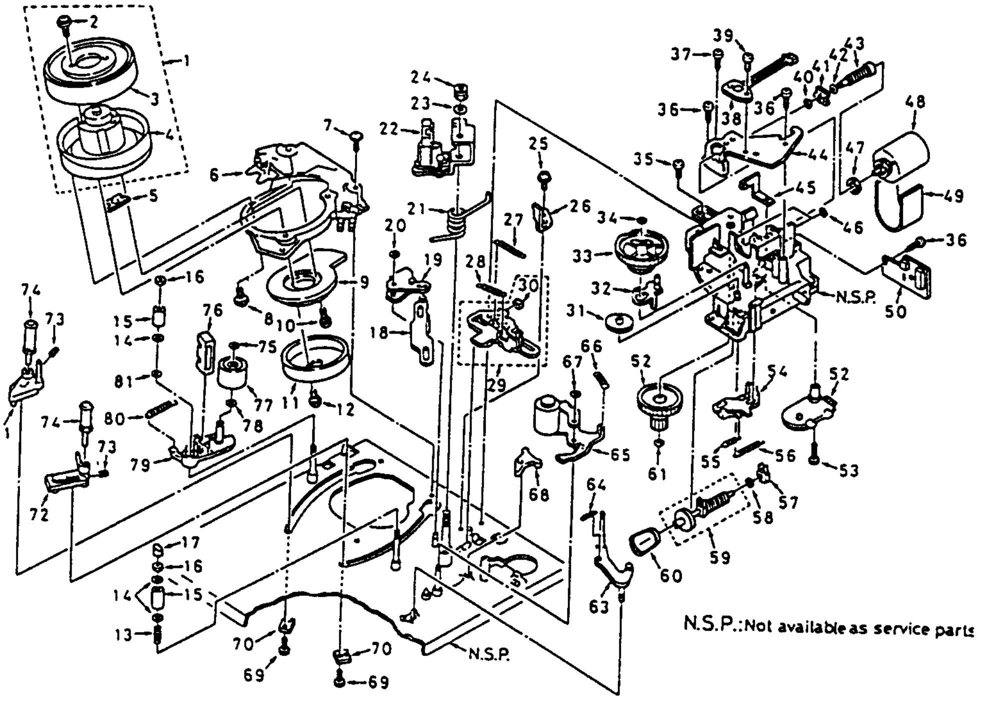
LOCATION	PARTS NO.	DESCRIPTION
46	613 022 0110	ASSY,REEL,TAKE UP
47	412 021 5306	SPECIAL WASHER 3.1×6×0.3
OR	412 015 8900	SPECIAL WASHER 3.1×6×0.4
OR	412 015 8504	SPECIAL WASHER 3.1×6×0.5
48	411 109 1506	WASHER Y 2.1×6×0.25
OR	411 109 1407	WASHER Y 2.1×5×0.25
49	613 098 7174	GEAR,REEL SUPPLY
50	412 026 7305	SPECIAL WASHER 2.6×6×0.25
51	613 098 7181	GEAR,REEL TAKE UP
54	411 031 0905	SCR BIN 2.6×4
55	613 085 7101	COMPL,IDLER,CLUTCH
56	411 120 1301	WASHER Y 2.1×4×0.25
57	613 022 0134	ASSY,IDLER
58	411 021 3107	SCR S-TPG BIN 2.6×8
59	613 078 6302	COMPL,MC-4
60	407 016 7205	LED LN59
61	613 021 9985	ASSY,SLIDE,ACT PLATE
62	613 112 8088	SLIDE,CONTROL BRAKE
OR	613 021 9992	ASSY,SLIDE,C BRAKE
63	613 022 1612	SPRING,RETURN SLIDE
64	613 022 1506	SPRING,SUB T
65	613 098 0106	ASSY,BRAKE,SUB T
66	613 077 3647	PULLEY,REEL
67	613 022 1490	SPRING,SUB SUPPLY
68	613 022 2374	SLIDE,ACT BRAKE
69	613 084 8871	BRAKE,SUB SUPPLY
70	613 022 0004	ASSY,SLIDE,M PLATE
71	613 080 9216	ASSY,BRAKE,SUPPLY
72	613 086 2914	SPRING,MAIN BRAKE
73	613 080 9209	ASSY,BRAKE,TAKE UP
74	411 109 3005	WASHER Y 2.6×5×0.5
75	613 022 2015	LEVER,CONT PLATE
76	412 015 9501	SPECIAL WASHER
77	411 021 7907	SCR S-TPG BIN 4×12



N.S.P.:Not available as service parts

MECHANISM PARTS 2

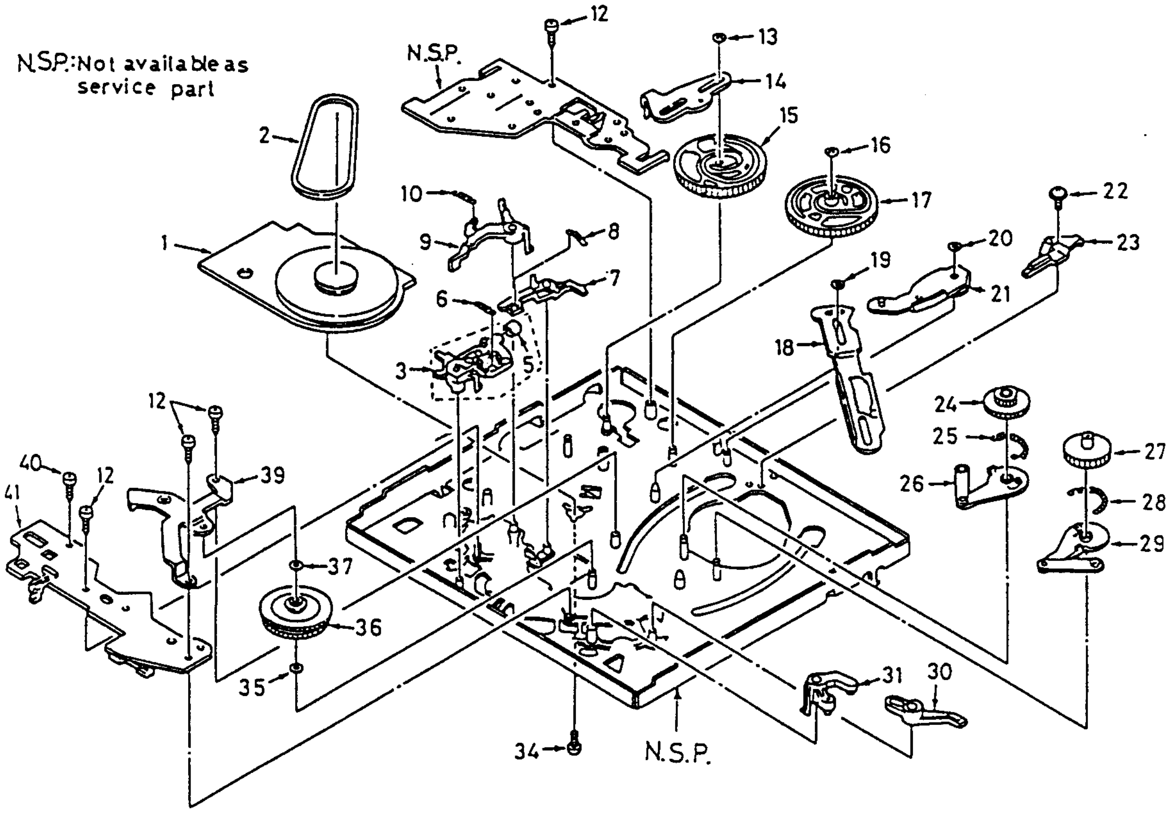
LOCATION	PARTS NO.	DESCRIPTION
1	613 087 1794	COMPL,CYLINDER,4H4P-V
2	411 038 1608	SCR PAN+W 3×8
3	613 087 1817	ASSY,CYLINDER,UPR 4H4P-V
4	613 089 7299	ASSY,CYLINDER,LWR 4HP
5	613 081 4036	SPACER,MOTOR
6	613 022 1001	BASE,CYLINDER
7	411 047 7509	SCR PAN+FLG 3×6
8	411 047 5000	SCR PAN+FLG 2.6×8
OR	412 030 9708	SPECIAL SCREW 2.6×8
9	613 085 7279	STATOR,MOTOR CYLINDER
10	411 044 9209	SCR PAN+SW 2.3×8
OR	411 044 8301	SCR PAN+SW 2.3×10
11	613 022 4019	ROTOR,MOTOR CYLINDER
12	411 044 9001	SCR PAN+SW 2.3×6
13	613 022 1766	SPRING,ADJUST GUIDE
14	613 053 3227	SPECIAL WASHER
15	613 058 3307	TAPE GUIDE
16	412 026 2607	SPECIAL NUT (M3)
17	613 085 2434	CAP
18	613 021 9961	ASSY,SLIDE,ACT PINCH
19	613 021 9800	ASSY,LEVER,CAM PINCH
20	411 109 2008	WASHER Y 3.1×8×0.5
21	613 022 1797	SPRING,ACE HEAD
22	613 021 9640	COMPL,BRACKET,HEAD
23	613 051 4615	SPACER
OR	613 110 1692	SPACER
24	412 015 8207	SPECIAL NUT (M5)
25	411 120 0007	SCR PAN+SW+W 2.6×5
26	613 022 0752	BRACKET,STOPPER
27	613 022 1575	SPRING,LINK LOCK
28	613 022 1582	SPRING,SLIDE BRAKE
29	613 094 9233	ASSY,SLIDE,CAM
30	613 022 2725	DAMPER
31	613 022 2534	GEAR,FRONT LOAD
32	613 094 1206	ASSY,LEVER,FRONT
33	613 077 3586	GEAR,HELICAL FRONT
34	613 027 0504	WASHER 4.1×6.5×R5T
35	411 046 8002	SCR PAN+SW+W 2.6×6
36	411 023 2801	SCR S-TPG PAN 2.6×6
37	411 021 3107	SCR S-TPG BIN 2.6×8
38	613 089 4328	ASSY,SENSOR,DEW
39	411 040 2303	SCR PAN 2.6×5
40	613 053 2381	SPECIAL WASHER
41	613 077 3227	HOLDER,WORM
42	613 027 0382	WASHER
43	613 078 8320	ASSY,WORM,FRONT
44	613 117 0599	BRACKET,HOLDER
OR	613 111 8522	BRACKET,HOLDER
OR	613 110 1203	BRACKET,HOLDER
OR	613 092 5862	BRACKET,HOLDER
45	613 093 9159	PLATE,NUT
46	613 093 8374	DAMPER,MOTOR
47	613 077 3616	DAMPER,WORM
48	613 021 9527	ASSY,LOADING MOTOR
49	613 092 9945	DAMPER,MOTOR
50	613 107 2732	COMPL,MC-3
52	613 110 0374	ROTARY SWITCH
53	411 126 5303	SCR PAN 2.6×13
54	613 092 9921	ASSY,SLIDE,FRONT
55	613 092 5985	SPRING,LEVER LOAD
56	613 092 5992	SPRING,LEVER ACT
57	613 092 5886	HOLDER,WORM
58	613 027 0627	WASHER 2.1×6×0.5
59	613 092 9938	ASSY,WORM,LOAD
60	613 022 2985	BELT;LOADING
61	412 033 4106	WASHER SLIT 2.6×5×0.5
62	613 077 3579	GEAR,HELICAL
63	613 102 9293	ASSY,LEVER,REV GUIDE
64	613 022 1568	SPRING,REVIEW LEVER
65	613 022 0158	COMPL,PINCH ROLLER
66	613 022 1483	SPRING,PINCH ROLLER
67	411 109 2107	WASHER Y 3.6×6×0.5
68	613 078 8160	COMPL,LEVER,ACT BRAKE
69	411 031 1209	SCR BIN 2.6×5
70	613 022 1919	PLATE,GUIDE
71	613 021 9725	ASSY,BASE,ROLLER S
72	613 021 9732	ASSY,BASE,ROLLER T
73	411 063 0904	SCR SET HEX-SCT 2×3
74	613 022 0233	ASSY,GUIDE,ROLLER
75	411 109 2602	WASHER Y 1.5×4×0.25
76	613 022 4224	HEAD,FULL ERASE
77	613 022 2817	IMPEDACE ROLLER
78	412 032 5807	SPECIAL WASHER 2.1×5×0.13
79	613 093 8305	ASSY,LEVER,FE HEAD
80	613 022 1698	SPRING,ERASE HEAD
81	411 109 1704	WASHER Y 6.4×10×0.25



N.S.P.:Not available as service parts

MECHANISM PARTS 3

LOCATION	PARTS NO.	DESCRIPTION
1	613 022 4491	MOTOR,CAPSTAN
2	613 022 2978	BELT,REEL DRIVE
3	613 021 9848	ASSY,LEVER,CLUTCH
5	613 079 1023	DAMPER,LEVER CLUTCH
6	613 022 1520	SPRING,LEVER CLUTCH
7	613 082 3434	LEVER,CHANGE CLUTCH
8	613 022 1711	SPRING,CHANGE CLUTCH
9	613 081 7518	ASSY,BRAKE CAPSTAN
10	613 098 2285	SPRING,CAPSTAN
12	411 021 3107	SCR S-TPG BIN 2.6×8
13	411 109 2008	WASHER Y 3.1×8×0.5
14	613 021 9978	ASSY,SLIDE,CAM PLATE
15	613 022 2701	CAM,MODE
16	411 109 1902	WASHER Y 3.1×6×0.5
17	613 022 2718	CAM,MAIN
18	613 022 2664	RACK,LOAD
19	411 109 1803	WASHER Y 2.6×6×0.5
20	411 109 2107	WASHER Y 3.6×6×0.5
OR	411 109 2206	WASHER Y 3.6×8×0.5
21	613 021 9794	ASSY,LEVER,CAM LOAD
22	411 047 6809	SCR PAN+FLG 3×4
23	613 021 9763	ASSY,EARTH,CYLINDER
24	613 090 6380	GEAR,LOAD TAKE UP
25	613 022 1551	SPRING,GEAR LOAD T
26	613 021 9879	ASSY,LEVER,LOAD T
27	613 090 6373	GEAR,LOAD SUPPLY
28	613 022 1704	SPRING,GEAR LOAD S
29	613 021 9862	ASSY,LEVER,LOAD S
30	613 022 2039	LEVER,RETURN TENSION
31	613 091 3104	ASSY,LEVER CONTROL
34	411 040 2303	SCR PAN 2.6×5
35	412 015 8603	SPECIAL WASHER 3.1×6×0.25
36	613 102 0900	ASSY,GEAR,FRICTION
37	411 109 1605	WASHER Y 2.6×6×0.25
39	613 079 8121	BRACKET,PULLEY
40	411 100 0300	SCR S-TPG BIN 2.6×5
41	613 110 1340	COMPL,MC-1
R1	401 026 0607	CARBON 270 JA 1/6W
OR	401 017 0708	CARBON 270 JA 1/4W
R2	401 024 6700	CARBON 100 JA 1/6W
OR	401 012 4404	CARBON 100 JA 1/4W
D1	407 094 1300	PHOTO COUPLE SPI-315-04-C
OR	407 043 0101	PHOTO DIODE ON2170-R
SW1	613 022 4545	SPECIAL SWITCH,EP


N.S.P.:Not available as service part

ELECTRICAL PARTS

NOTE;

*Materials of Capacitors and Resistors are abbreviated as follows;

Resistors

MT-FILE	Metal Film Resistor
MT-GLAZE	Metal Glaze Resistor
OXIDE-MT	Oxide Metal Film Resistor

Capacitors

MT-POLYEST	Metallized Polyester Capacitor
MT-COMPO	Metallized Composite Capacitor
TA-SOLID	Tantalum Solid Capacitor
AL-SOLID	Aluminum Solid Capacitor
NP-ELECT	Non-Polarized Electrolytic Capacitor
OS-SOLID	Aluminum Solid Capacitors with Organic Semiconductive Electrolytic Capacitor
DL-ELECT	Double Layered Electrolytic Capacitor

*Tolerance of Capacitor(10pF over) and Resistor are noted with follow symboles.

F ············ ±1% G ············ ±2% J ············ ±5% K ············ ±10%
M ············ ±20% N ············ ±30% Z ············ +80% ~ −20%

*N.S.P. : Not available as service parts.

LOCATION	PARTS NO.	DESCRIPTION
COMPL.CP-A		
COMPL.NO.	613 112 3472	(EUROPE)
COMPL.NO.	613 116 7858	(SPAIN)
	613 079 8138	HOLDER,AD-1
VIDEO CIRCUIT(VD-A)		
B1001	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
B1201	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
B1601	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
B1651	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
C1001	403 025 7007	CERAMIC 4.7P D 50V
C1002	403 073 2702	CERAMIC 390P J 50V
C1003	403 026 2209	CERAMIC 47P J 50V
C1004	403 179 4501	NP-ELECT 0.47U M 50V
C1005	403 150 1703	CERAMIC 91P J 50V
C1006	403 071 1509	CERAMIC 180P J 50V
C1007	403 075 4001	CERAMIC 820P J 50V
C1008	403 134 4706	NP-ELECT 2.2U M 50V
C1009	403 001 1906	CERAMIC 0.01U M 16V
C1010	403 121 3408	ELECT 2.2U M 50V
C1011	403 130 2904	ELECT 0.47U M 50V
C1012	403 075 3103	CERAMIC 82P J 50V
C1013	403 068 8801	CERAMIC 100P J 50V
C1014	403 063 2200	POLYESTER 0.068U K 50V
C1015	403 001 1906	CERAMIC 0.01U M 16V
C1016	403 001 1906	CERAMIC 0.01U M 16V
C1017	403 001 1906	CERAMIC 0.01U M 16V
C1018	403 139 1007	ELECT 47U M 6.3V
C1019	403 121 3408	ELECT 2.2U M 50V
C1020	403 107 9905	ELECT 10U M 16V
C1021	403 121 3408	ELECT 2.2U M 50V
C1023	403 001 1906	CERAMIC 0.01U M 16V
C1024	403 121 2104	ELECT 22U M 10V
C1025	403 130 2904	ELECT 0.47U M 50V
C1031	403 001 1906	CERAMIC 0.01U M 16V
C1032	403 135 5009	ELECT 47U M 10V
C1033	403 001 1906	CERAMIC 0.01U M 16V
C1034	403 001 1906	CERAMIC 0.01U M 16V
C1035	403 121 3002	ELECT 4.7U M 25V
C1036	403 109 6308	ELECT 1U M 50V
C1037	403 026 2209	CERAMIC 47P J 50V
C1038	403 025 7007	CERAMIC 4.7P D 50V
C1039	403 026 2209	CERAMIC 47P J 50V
C1043	403 073 6205	CERAMIC 470P J 50V
C1051	403 001 1906	CERAMIC 0.01U M 16V
C1058	403 026 2209	CERAMIC 47P J 50V
C1060	403 002 4708	CERAMIC 0.1U Z 25V
C1062	403 074 8703	CERAMIC 680P J 50V
C1063	403 022 7703	CERAMIC 33P J 50V
C1065	403 022 7703	CERAMIC 33P J 50V
C1101	403 003 2505	CERAMIC 0.022U J 25V
C1102	403 001 1906	CERAMIC 0.01U M 16V
C1103	403 109 6308	ELECT 1U M 50V
C1104	403 001 1906	CERAMIC 0.01U M 16V
C1105	403 109 6308	ELECT 1U M 50V
C1106	403 139 2707	ELECT 1U M 50V
C1107	403 003 2505	CERAMIC 0.022U J 25V
C1108	403 104 8505	CERAMIC 0.047U J 25V
C1109	403 001 1906	CERAMIC 0.01U M 16V
C1111	403 001 1906	CERAMIC 0.01U M 16V
C1112	403 109 6308	ELECT 1U M 50V
C1113	403 104 8505	CERAMIC 0.047U J 25V
C1114	403 025 8608	CERAMIC 43P J 50V
C1115	403 150 1703	CERAMIC 91P J 50V
C1116	403 001 1906	CERAMIC 0.01U M 16V
C1117	403 135 4002	ELECT 47U M 6.3V
C1118	403 068 8801	CERAMIC 100P J 50V
C1119	403 001 1906	CERAMIC 0.01U M 16V
C1120	403 093 8104	OS-SOLID 4.7U M 10V
C1121	403 001 1906	CERAMIC 0.01U M 16V
C1124	403 073 8407	CERAMIC 4700P K 50V
C1125	403 070 3702	CERAMIC 120P J 50V
C1126	403 001 1906	CERAMIC 0.01U M 16V
C1128	403 071 6207	CERAMIC 220P K 50V
C1201	403 075 4001	CERAMIC 820P J 50V
C1401	403 139 2202	ELECT 4.7U M 25V
C1506	403 028 3402	CERAMIC 56P J 50V
C1601	403 107 9905	ELECT 10U M 16V
C1602	403 107 9905	ELECT 10U M 16V
C1603	403 068 9402	CERAMIC 100P K 50V
C1604	403 002 4708	CERAMIC 0.1U Z 25V
C1605	403 135 4101	ELECT 470U M 6.3V
C1608	403 121 2104	ELECT 22U M 10V
C1609	403 093 9606	OS-SOLID 1U M 16V
C1631	403 022 7703	CERAMIC 33P J 50V
C1632	403 024 1501	CERAMIC 39P J 50V
C1682	403 012 6006	CERAMIC 15P J 50V
D1001	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1002	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1003	407 007 9904	DIODE GMA01-BT

LOCATION	PARTS NO.	DESCRIPTION
D1003	407 012 4406	DIODE 1SS133-T-77
D1004	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1005	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1031	407 070 8408	ZENER DIODE GZS9.1Y-TB
OR	407 053 8906	ZENER DIODE MTZ9.1C-T-77
D1311	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1312	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1313	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1601	407 070 7104	ZENER DIODE GZS5.6X-BT
OR	407 053 6704	ZENER DIODE MTZ5.6B-T-77
D1603	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1604	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1606	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1651	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1652	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D1653	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
DL131	613 110 0367	DELAY.2H
OR	613 110 1708	DELAY.2H
IC101	409 178 3309	IC LA7340
IC102	409 171 9209	IC LC8992
IC111	409 208 7208	IC LA7332
IC161	409 120 3401	IC LA7221
L1001	613 014 0951	COIL.INDUCTOR 68UHK
L1031	613 014 0968	COIL.INDUCTOR 82UHK
L1033	613 014 0739	COIL.INDUCTOR 1.0UHM
L1054	613 014 0876	COIL.INDUCTOR 15UHK
L1055	613 014 0876	COIL.INDUCTOR 15UHK
L1056	613 014 0975	COIL.INDUCTOR 100UHK
L1057	613 014 0821	COIL.INDUCTOR 5.6UHK
L1058	613 014 0944	COIL.INDUCTOR 56UHK
L1101	613 014 0883	COIL.INDUCTOR 18UHK
L1102	613 014 0791	COIL.INDUCTOR 3.3UHK
L1103	613 014 0876	COIL.INDUCTOR 15UHK
L1104	613 015 6327	COIL.INDUCTOR 1MHJ
L1105	613 014 0937	COIL.INDUCTOR 47UHK
L1631	613 014 0975	COIL.INDUCTOR 100UHK
L1681	613 014 0777	COIL.INDUCTOR 2.2UHM
Q1001	405 093 0508	TR KSA1175-Y
OR	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
Q1002	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1003	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1004	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q

LOCATION	PARTS NO.	DESCRIPTION
Q1004	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1031	405 093 0508	TR KSA1175-Y
OR	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
Q1032	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1052	405 012 9506	TR 2SC2058S-DCTP-Q
OR	405 015 2504	TR 2SC2669-O-TPE4
OR	405 015 2603	TR 2SC2669-Y-TPE4
OR	405 016 0905	TR 2SC2839-E-SPA-AC
OR	405 016 1100	TR 2SC2839-F-SPA-AC
Q1054	405 016 0905	TR 2SC2839-E-SPA-AC
OR	405 016 1100	TR 2SC2839-F-SPA-AC
OR	405 015 2603	TR 2SC2669-Y-TPE4
OR	405 015 2504	TR 2SC2669-O-TPE4
OR	405 012 9506	TR 2SC2058S-DCTP-Q
Q1101	405 093 0508	TR KSA1175-Y
OR	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
Q1102	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1103	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1104	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1105	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1106	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1151	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
OR	405 093 0508	TR KSA1175-Y
Q1401	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1402	405 006 6504	TR 2SA984-E-AA
OR	405 006 6702	TR 2SA984-F-AA
Q1403	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC

LOCATION	PARTS NO.	DESCRIPTION
Q1403	405 019 2807	TR 2SC536-F-SPA-AC
Q1404	405 089 0109	TR 2SA1707-T-AN
OR	405 084 7905	TR 2SB1240-TV2-R
Q1601	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1806	TR 2SA933S-T93-R
Q1602	405 093 0508	TR KSA1175-Y
OR	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
Q1631	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q1651	405 093 0508	TR KSA1175-Y
OR	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
R1001	401 020 1907	CARBON 4.7K JA 1/4W
R1002	401 017 1705	CARBON 2.7K JA 1/4W
R1003	401 022 1806	CARBON 680 JA 1/4W
R1004	401 012 9201	CARBON 1M JA 1/4W
R1005	401 012 5609	CARBON 1K JA 1/4W
R1006	401 017 1705	CARBON 2.7K JA 1/4W
R1007	401 012 5609	CARBON 1K JA 1/4W
R1008	401 023 1607	CARBON 820 JA 1/4W
R1009	401 012 5609	CARBON 1K JA 1/4W
R1010	401 017 8506	CARBON 300 JA 1/4W
R1011	401 015 2605	CARBON 1.8K JA 1/4W
R1012	401 015 4609	CARBON 180K JA 1/4W
R1013	401 012 9201	CARBON 1M JA 1/4W
R1014	401 016 3700	CARBON 2.2K JA 1/4W
R1015	401 023 2703	CARBON 8.2K JA 1/4W
R1016	401 013 5202	CARBON 1.2K JA 1/4W
R1017	401 018 4804	CARBON 33K JA 1/4W
R1018	401 012 5609	CARBON 1K JA 1/4W
R1019	401 016 2505	CARBON 220 JA 1/4W
R1020	401 020 3802	CARBON 470K JA 1/4W
R1021	401 014 6000	CARBON 150K JA 1/4W
R1022	401 022 1806	CARBON 680 JA 1/4W
R1023	401 016 4707	CARBON 22K JA 1/4W
R1024	401 020 2805	CARBON 47K JA 1/4W
R1025	401 016 3700	CARBON 2.2K JA 1/4W
R1026	401 012 5609	CARBON 1K JA 1/4W
R1031	401 012 5609	CARBON 1K JA 1/4W
R1032	401 018 9700	CARBON 39 JA 1/4W
R1033	401 018 9700	CARBON 39 JA 1/4W
R1034	401 018 9700	CARBON 39 JA 1/4W
R1051	401 016 4707	CARBON 22K JA 1/4W
R1052	401 016 4707	CARBON 22K JA 1/4W
R1056	401 019 0904	CARBON 390 JA 1/4W
R1057	401 023 1607	CARBON 820 JA 1/4W
R1066	401 023 1607	CARBON 820 JA 1/4W
R1067	401 023 1607	CARBON 820 JA 1/4W
R1068	401 021 1807	CARBON 560 JA 1/4W
R1071	401 020 0702	CARBON 470 JA 1/4W
R1072	401 019 0904	CARBON 390 JA 1/4W
R1101	401 020 2805	CARBON 47K JA 1/4W
R1102	401 016 4707	CARBON 22K JA 1/4W
R1103	401 012 5609	CARBON 1K JA 1/4W
R1104	401 013 5202	CARBON 1.2K JA 1/4W
R1105	401 018 2701	CARBON 330 JA 1/4W
R1106	401 021 1807	CARBON 560 JA 1/4W
R1107	401 012 5609	CARBON 1K JA 1/4W
R1108	401 012 5609	CARBON 1K JA 1/4W
R1109	401 012 6903	CARBON 10K JA 1/4W

LOCATION	PARTS NO.	DESCRIPTION
R1110	401 023 2703	CARBON 8.2K JA 1/4W
R1111	401 012 5609	CARBON 1K JA 1/4W
R1112	401 015 2605	CARBON 1.8K JA 1/4W
R1113	401 012 8006	CARBON 100K JA 1/4W
R1114	401 019 0904	CARBON 390 JA 1/4W
R1115	401 012 5609	CARBON 1K JA 1/4W
R1116	401 019 1802	CARBON 3.9K JA 1/4W
R1117	401 014 4006	CARBON 1.5K JA 1/4W
R1118	401 022 7105	CARBON 750 JA 1/4W
R1119	401 012 5609	CARBON 1K JA 1/4W
R1120	401 012 4404	CARBON 100 JA 1/4W
R1121	401 012 5609	CARBON 1K JA 1/4W
R1122	401 020 0702	CARBON 470 JA 1/4W
R1123	401 014 4006	CARBON 1.5K JA 1/4W
R1124	401 015 8805	CARBON 200 JA 1/4W
R1125	401 023 1607	CARBON 820 JA 1/4W
R1126	401 012 5609	CARBON 1K JA 1/4W
R1127	401 014 8202	CARBON 160 JA 1/4W
R1128	401 012 5609	CARBON 1K JA 1/4W
R1152	401 012 5609	CARBON 1K JA 1/4W
R1311	401 013 6308	CARBON 12K JA 1/4W
R1401	401 016 4707	CARBON 22K JA 1/4W
R1402	401 016 4707	CARBON 22K JA 1/4W
R1403	401 020 1907	CARBON 4.7K JA 1/4W
R1404	401 020 1907	CARBON 4.7K JA 1/4W
R1405	401 020 2805	CARBON 47K JA 1/4W
R1406	401 020 2805	CARBON 47K JA 1/4W
R1407	401 015 2605	CARBON 1.8K JA 1/4W
R1408	401 016 2505	CARBON 220 JA 1/4W
R1508	401 017 0708	CARBON 270 JA 1/4W
R1603	401 012 6903	CARBON 10K JA 1/4W
R1606	401 012 5609	CARBON 1K JA 1/4W
R1607	401 021 1807	CARBON 560 JA 1/4W
R1608	401 022 6702	CARBON 75 JA 1/4W
R1609	401 013 9408	CARBON 1.3K JA 1/4W
R1610	401 021 1807	CARBON 560 JA 1/4W
R1611	401 012 5609	CARBON 1K JA 1/4W
R1613	401 016 4707	CARBON 22K JA 1/4W
R1631	401 021 2903	CARBON 5.6K JA 1/4W
R1632	401 012 5609	CARBON 1K JA 1/4W
R1633	401 023 1607	CARBON 820 JA 1/4W
R1634	401 015 2605	CARBON 1.8K JA 1/4W
R1641	401 015 2605	CARBON 1.8K JA 1/4W
R1651	401 012 6903	CARBON 10K JA 1/4W
R1652	401 012 5609	CARBON 1K JA 1/4W
R1653	401 021 2903	CARBON 5.6K JA 1/4W
R1654	401 021 2903	CARBON 5.6K JA 1/4W
R1655	401 016 4707	CARBON 22K JA 1/4W
R1656	401 021 0602	CARBON 56 JA 1/4W
VR101	613 001 8977	SEMI VR 1KB
OR	613 001 9370	SEMI VR 1KB
OR	613 079 2525	VR.SEMI 1KB
VR102	613 001 9035	SEMI VR 10KB
OR	613 001 9417	SEMI VR 10KB
OR	613 079 2532	VR.SEMI 10KB
VR103	613 001 9417	SEMI VR 10KB
OR	613 001 9035	SEMI VR 10KB
OR	613 079 2532	VR.SEMI 10KB
VR104	613 001 9035	SEMI VR 10KB
OR	613 001 9417	SEMI VR 10KB
OR	613 079 2532	VR.SEMI 10KB
VR105	613 001 8977	SEMI VR 1KB
OR	613 001 9370	SEMI VR 1KB
OR	613 079 2525	VR.SEMI 1KB
X1101	613 080 9407	OSC.CRYSTAL 4.43MHZ
OR	613 093 8008	OSC.CRYSTAL 4.433619MHZ

LOCATION	PARTS NO.	DESCRIPTION
XF101	613 004 5539	LC PACK 4MHZ LPF
XF111	613 004 5485	LC PACK

AUDIO CIRCUIT(AD-A)

LOCATION	PARTS NO.	DESCRIPTION
B2303	405 076 6404	TR DTC343T-STP
B2304	405 076 6404	TR DTC343T-STP
B2403	405 076 6404	TR DTC343T-STP
B2404	405 076 6404	TR DTC343T-STP
B2501	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B2502	405 003 7702	TR 2SA1346-AC
B2503	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B2505	405 063 9708	TR DTC144EL-TL2
B2506	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B2508	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B2509	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B2510	405 003 7702	TR 2SA1346-AC
B2512	405 003 7702	TR 2SA1346-AC
B2514	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B2518	405 018 2808	TR 2SC3402-AC
B2519	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
C2301	403 121 3002	ELECT 4.7U M 25V
C2302	403 121 3002	ELECT 4.7U M 25V
C2303	403 121 3002	ELECT 4.7U M 25V
C2304	403 001 1609	CERAMIC 0.01U K 16V
C2305	403 129 5602	ELECT 33U M 10V
C2306	403 107 9905	ELECT 10U M 16V
C2307	403 107 9509	ELECT 100U M 10V
C2308	403 135 5009	ELECT 47U M 10V
C2309	403 134 9602	ELECT 47U M 16V
C2310	403 107 9905	ELECT 10U M 16V
C2311	403 129 5602	ELECT 33U M 10V
C2312	403 001 1609	CERAMIC 0.01U K 16V
C2313	403 134 8100	ELECT 100U M 6.3V
C2314	403 001 3801	CERAMIC 1500P K 16V
C2315	403 073 7004	CERAMIC 470P K 50V
C2318	403 001 1609	CERAMIC 0.01U K 16V
C2319	403 135 3500	ELECT 220U M 6.3V
C2320	403 135 5009	ELECT 47U M 10V
C2321	403 073 7004	CERAMIC 470P K 50V
C2401	403 121 3002	ELECT 4.7U M 25V
C2402	403 121 3002	ELECT 4.7U M 25V
C2403	403 121 3002	ELECT 4.7U M 25V
C2404	403 001 1609	CERAMIC 0.01U K 16V
C2405	403 129 5602	ELECT 33U M 10V
C2406	403 107 9905	ELECT 10U M 16V
C2407	403 107 9509	ELECT 100U M 10V
C2408	403 135 5009	ELECT 47U M 10V
C2409	403 134 9602	ELECT 47U M 16V
C2410	403 107 9905	ELECT 10U M 16V
C2411	403 129 5602	ELECT 33U M 10V
C2412	403 001 1609	CERAMIC 0.01U K 16V
C2413	403 134 8100	ELECT 100U M 6.3V
C2414	403 001 3801	CERAMIC 1500P K 16V
C2415	403 073 7004	CERAMIC 470P K 50V
C2418	403 001 1609	CERAMIC 0.01U K 16V
C2419	403 135 3500	ELECT 220U M 6.3V
C2420	403 135 5009	ELECT 47U M 10V
C2421	403 073 7004	CERAMIC 470P K 50V
C2501	403 135 7805	ELECT 3.3U M 50V
C2502	403 134 9602	ELECT 47U M 16V

LOCATION	PARTS NO.	DESCRIPTION
C2503	403 107 9905	ELECT 10U M 16V
C2504	403 125 5606	ELECT 100U M 16V
C2505	403 001 1609	CERAMIC 0.01U K 16V
C2506	403 069 1207	CERAMIC 1000P K 50V
C2507	403 073 6205	CERAMIC 470P J 50V
C2508	403 135 3708	ELECT 33U M 6.3V
C2509	403 121 3002	ELECT 4.7U M 25V
C2510	403 107 9905	ELECT 10U M 16V
C2511	403 107 9905	ELECT 10U M 16V
C2513	403 121 3408	ELECT 2.2U M 50V
C2514	403 134 9602	ELECT 47U M 16V
C2515	403 001 1609	CERAMIC 0.01U K 16V
C2517	403 003 6701	CERAMIC 0.033U K 25V
C2518	403 125 5606	ELECT 100U M 16V
C2520	403 135 5009	ELECT 47U M 10V
C2521	403 069 1207	CERAMIC 1000P K 50V
C2522	403 001 1609	CERAMIC 0.01U K 16V
C2525	403 028 3402	CERAMIC 56P J 50V
D2501	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D2502	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D2504	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D2505	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D2509	407 053 6308	ZENER DIODE MTZ5.1B-T-77
D2510	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D2511	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D2512	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D2515	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
IC231	409 226 4906	IC UPC2354GF
IC232	409 036 8309	IC M5236L-TC04A-31
IC233	409 039 7309	IC NJM4556S
L2301	613 015 6730	COIL,INDUCTOR 100UHK
L2401	613 015 6730	COIL,INDUCTOR 100UHK
Q2502	405 007 3106	TR 2SB544-F-MP-AE
Q2503	405 089 2103	TR 2SC4483-S-AN
R2301	401 015 3701	CARBON 18K JA 1/4W
R2302	401 020 2805	CARBON 47K JA 1/4W
R2303	401 013 6308	CARBON 12K JA 1/4W
R2304	401 020 2805	CARBON 47K JA 1/4W
R2305	401 015 3701	CARBON 18K JA 1/4W
R2306	401 020 2805	CARBON 47K JA 1/4W
R2307	401 012 5609	CARBON 1K JA 1/4W
R2308	401 012 6903	CARBON 10K JA 1/4W
R2309	401 020 8302	CARBON 5.1K JA 1/4W
R2311	401 016 0402	CARBON 200K JA 1/4W
R2312	401 017 9701	CARBON 30K JA 1/4W
R2313	401 087 2909	MT-FILM 12K FD 1/6W
R2314	401 014 9001	CARBON 16K JA 1/4W
R2315	401 016 9603	CARBON 27 JA 1/4W
R2316	401 016 3700	CARBON 2.2K JA 1/4W
R2317	401 016 2505	CARBON 220 JA 1/4W
R2318	401 020 1907	CARBON 4.7K JA 1/4W
R2323	401 020 1907	CARBON 4.7K JA 1/4W
R2401	401 015 3701	CARBON 18K JA 1/4W
R2402	401 020 2805	CARBON 47K JA 1/4W
R2403	401 013 6308	CARBON 12K JA 1/4W
R2404	401 020 2805	CARBON 47K JA 1/4W

LOCATION	PARTS NO.	DESCRIPTION
R2405	401 015 3701	CARBON 18K JA 1/4W
R2406	401 020 2805	CARBON 47K JA 1/4W
R2407	401 012 5609	CARBON 1K JA 1/4W
R2408	401 012 6903	CARBON 10K JA 1/4W
R2409	401 020 8302	CARBON 5.1K JA 1/4W
R2411	401 016 0402	CARBON 200K JA 1/4W
R2412	401 017 9701	CARBON 30K JA 1/4W
R2413	401 091 3305	MT-FILM 7.5K FD 1/6W
R2414	401 020 1907	CARBON 4.7K JA 1/4W
R2415	401 016 9603	CARBON 27 JA 1/4W
R2416	401 016 3700	CARBON 2.2K JA 1/4W
R2417	401 016 2505	CARBON 220 JA 1/4W
R2501	401 012 6903	CARBON 10K JA 1/4W
R2502	401 012 6903	CARBON 10K JA 1/4W
R2503	401 012 6903	CARBON 10K JA 1/4W
R2504	401 013 6308	CARBON 12K JA 1/4W
R2505	401 012 6903	CARBON 10K JA 1/4W
R2506	401 020 1907	CARBON 4.7K JA 1/4W
R2507	401 020 1907	CARBON 4.7K JA 1/4W
R2509	401 012 9201	CARBON 1M JA 1/4W
R2510	401 012 8006	CARBON 100K JA 1/4W
R2511	401 013 6308	CARBON 12K JA 1/4W
R2512	401 023 7401	CARBON 9.1K JA 1/4W
R2513	401 012 6903	CARBON 10K JA 1/4W
R2514	401 023 7401	CARBON 9.1K JA 1/4W
R2515	401 012 6903	CARBON 10K JA 1/4W
R2518	401 017 8506	CARBON 300 JA 1/4W
R2519	401 019 2908	CARBON 39K JA 1/4W
R2520	401 016 4707	CARBON 22K JA 1/4W
R2521	401 017 9701	CARBON 30K JA 1/4W
R2522	401 020 1907	CARBON 4.7K JA 1/4W
R2524	401 012 6903	CARBON 10K JA 1/4W
R2525	401 018 4804	CARBON 33K JA 1/4W
R2526	401 016 4707	CARBON 22K JA 1/4W
R2527	401 019 1802	CARBON 3.9K JA 1/4W
R2528	401 016 4707	CARBON 22K JA 1/4W
R2529	401 018 8307	CARBON 36K JA 1/4W
R2531	401 012 5609	CARBON 1K JA 1/4W
R2534	401 016 2505	CARBON 220 JA 1/4W
R2535	401 014 5102	CARBON 15K JA 1/4W
R2536	401 019 7705	CARBON 4.3K JA 1/4W
R2537	401 018 4804	CARBON 33K JA 1/4W
R2538	401 020 1907	CARBON 4.7K JA 1/4W
R2539	401 019 7200	CARBON 430 JA 1/4W
R2540	401 012 6903	CARBON 10K JA 1/4W
R2541	401 020 1907	CARBON 4.7K JA 1/4W
R2542	401 012 6903	CARBON 10K JA 1/4W
R2544	401 087 4804	MT-FILM 8.2K FD 1/6W
R2545	401 012 6903	CARBON 10K JA 1/4W
R2546	401 014 4006	CARBON 1.5K JA 1/4W
R2547	401 014 4006	CARBON 1.5K JA 1/4W
VR235	613 001 9417	SEMI VR 10KB
OR	613 079 2532	VR.SEMI 10KB
VR236	613 001 9417	SEMI VR 10KB
OR	613 079 2532	VR.SEMI 10KB
VR239	613 001 9400	SEMI VR 5KB
OR	613 112 4912	VR.SEMI 5KB
VR243	613 001 5648	SEMI VR 100KB
VR251	613 001 5853	SEMI VR 10KB
VR252	613 001 5853	SEMI VR 10KB

SERVO CIRCUIT(SV-A)

R3594	401 012 5609	CARBON 1K JA 1/4W
R3901	401 018 4804	CARBON 33K JA 1/4W
VR351	613 001 9110	SEMI VR 220KB
OR	613 097 7953	VR.SEMI 220KB

POWER SUPPLY CIRCUIT(PW-A)

LOCATION	PARTS NO.	DESCRIPTION
C5401	403 001 1609	CERAMIC 0.01U K 16V
C5402	403 135 4002	ELECT 47U M 6.3V
D5401	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D5402	407 099 5204	ZENER DIODE MTZJ5.1B-T-77
D5403	407 053 7701	ZENER DIODE MTZ6.8C-T-77
D5404	407 078 2705	DIODE 1SS244-T-77
D5405	407 078 1104	ZENER DIODE MTZ33A-T-77
D5406	407 053 2706	ZENER DIODE MTZ10C-T-77
D5407	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D5410	407 005 8701	DIODE ERA15-02-V5
OR	407 004 9709	DIODE DSK10C-BT
L5401	613 015 6600	COIL.INDUCTOR 8.2UHK
OR	613 014 8636	HF CHOKE 8.2UH K
Q5401	405 088 9103	TR 2SA1703-S-AN
Q5402	405 089 2400	TR 2SC4484-S-AN
Q5403	405 006 7006	TR 2SA984K-E-AA
OR	405 006 7204	TR 2SA984K-F-AA
Q5404	405 006 7006	TR 2SA984K-E-AA
OR	405 006 7204	TR 2SA984K-F-AA
R5401	401 021 8905	CARBON 6.2K JA 1/4W
R5402	401 016 3700	CARBON 2.2K JA 1/4W
R5403	401 012 5609	CARBON 1K JA 1/4W
R5404 ⚠	402 041 6209	FUSIBLE RES 820 JA 1/4W
R5405	401 021 2903	CARBON 5.6K JA 1/4W
R5406	401 014 5102	CARBON 15K JA 1/4W
R5407	401 019 7705	CARBON 4.3K JA 1/4W
R5408 ⚠	402 004 1906	FUSIBLE RES 47 JA 1/4W
R5409	401 013 6308	CARBON 12K JA 1/4W
R5410	401 014 2804	CARBON 150 JA 1/4W
R5411	401 014 2804	CARBON 150 JA 1/4W
R5414	401 021 2903	CARBON 5.6K JA 1/4W
R5416	401 015 3701	CARBON 18K JA 1/4W

TUNER CIRCUIT(TN-A)

B6002	405 003 7603	TR 2SA1345-AC
OR	405 000 2205	TR DTA144ES-DCTP
OR	405 063 9104	TR DTA144EL-TL2
B6003	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
C6006	403 125 5606	ELECT 100U M 16V
C6008	403 109 6308	ELECT 1U M 50V
C6009	403 135 7409	ELECT 22U M 50V
C6010	403 121 9509	CERAMIC 0.1U Z 50V
D6001	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D6004	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D6005	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D6006	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D6007	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D6008	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
IC601	409 026 8203	IC L5631
OR	409 057 5103	IC UPC574J

LOCATION	PARTS NO.	DESCRIPTION
IC602	409 148 5005	IC M6M80021P
Q6002	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
OR	405 093 0508	TR KSA1175-Y
Q6003	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2807	TR 2SC536-F-SPA-AC
OR	405 093 0607	TR KSC2785-Y
R6001	401 018 2701	CARBON 330 JA 1/4W
R6002	401 019 0904	CARBON 390 JA 1/4W
R6006	401 019 3905	CARBON 390K JA 1/4W
R6007	401 020 3802	CARBON 470K JA 1/4W
R6008	401 012 5609	CARBON 1K JA 1/4W
R6010	401 012 6903	CARBON 10K JA 1/4W
R6011	401 020 1907	CARBON 4.7K JA 1/4W
R6015	401 012 6903	CARBON 10K JA 1/4W

RF CONVERTER CIRCUIT(CV-A)

LOCATION	PARTS NO.	DESCRIPTION
C6601	403 134 8100	ELECT 100U M 6.3V
C6602	403 134 8100	ELECT 100U M 6.3V
L6601	613 015 6631	COIL,INDUCTOR 15UHK
OR	613 014 8667	HF CHOKE 15UH K
L6602	613 015 6631	COIL,INDUCTOR 15UHK
OR	613 014 8667	HF CHOKE 15UH K
R6603	401 016 3700	CARBON 2.2K JA 1/4W
R6604	401 019 1802	CARBON 3.9K JA 1/4W

COMPL,VD-1

COMPL.NO. 613 108 4186

LOCATION	PARTS NO.	DESCRIPTION
B1701	405 018 2402	TR 2SC3398-TB
OR	405 000 2908	TR DTC114EK-T96
C1701	403 069 5601	CERAMIC 0.01U K 50V
C1702	403 009 5807	CERAMIC 100P J 50V
C1703	403 189 2405	ELECT 10U M 16V
C1704	403 068 0409	CERAMIC 0.1U Z 25V
C1705	403 189 2405	ELECT 10U M 16V
C1706	403 069 5601	CERAMIC 0.01U K 50V
D1701	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
IC171	409 003 4907	IC BA7025L
J1701	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
Q1701	405 014 4400	TR 2SC2412K-T96-Q
OR	405 014 4509	TR 2SC2412K-T96-R
OR	405 014 4608	TR 2SC2412K-T96-S
OR	405 015 8407	TR 2SC2812-L5-TB
OR	405 015 8704	TR 2SC2812-L6-TB
R1701	401 038 0800	MT-GLAZE 22K JA 1/10W
R1702	401 037 5608	MT-GLAZE 10K JA 1/10W
R1703	401 038 7700	MT-GLAZE 5.6K JA 1/10W
R1704	401 037 5400	MT-GLAZE 1K JA 1/10W
R1705	401 038 0800	MT-GLAZE 22K JA 1/10W
R1706	401 037 5400	MT-GLAZE 1K JA 1/10W
R1707	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1708	401 037 8104	MT-GLAZE 150K JA 1/10W
R1709	401 038 5805	MT-GLAZE 430 JA 1/10W
R1710	401 038 0800	MT-GLAZE 22K JA 1/10W
R1711	401 037 5608	MT-GLAZE 10K JA 1/10W
XF171	613 084 1681	FILTER 4.16MHZ B.F
XF172	613 015 8604	CHOKE COIL

COMPL,VP-1

COMPL.NO. 613 111 9741

VIDEO PRE-AMP. CIRCUIT(VP-A)

LOCATION	PARTS NO.	DESCRIPTION
C1801	403 069 1207	CERAMIC 1000P K 50V
C1803	403 093 8104	OS-SOLID 4.7U M 10V
C1804	403 073 6205	CERAMIC 470P J 50V
C1805	403 075 3103	CERAMIC 82P J 50V
C1806	403 001 1906	CERAMIC 0.01U M 16V
C1807	403 001 1906	CERAMIC 0.01U M 16V
C1808	403 003 3304	CERAMIC 0.022U M 25V
C1809	403 094 2408	OS-SOLID 4.7U M 16V
C1811	403 003 3304	CERAMIC 0.022U M 25V
C1812	403 191 8709	ELECT 1U M 50V
C1813	403 003 1805	CERAMIC 2200P M 25V
C1814	403 003 7104	CERAMIC 0.033U M 25V
C1815	403 026 2209	CERAMIC 47P J 50V
C1816	403 026 2209	CERAMIC 47P J 50V
C1817	403 003 7104	CERAMIC 0.033U M 25V
C1818	403 003 1805	CERAMIC 2200P M 25V
IC181	409 134 2001	IC LA7320
L1801	613 014 0968	COIL,INDUCTOR 82UHK
L1802	613 014 0951	COIL,INDUCTOR 68UHK
R1801	401 013 5202	CARBON 1.2K JA 1/4W
R1802	401 015 1509	CARBON 180 JA 1/4W
R1803	401 016 2505	CARBON 220 JA 1/4W
R1804	401 020 5509	CARBON 5.1 JA 1/4W
VR181	613 002 0345	SEMI VR 1KB
OR	613 117 1664	VR.SEMI 1KB
VR182	613 002 0345	SEMI VR 1KB
OR	613 117 1664	VR.SEMI 1KB

AUDIO PRE-AMP. CIRCUIT(AP-A)

LOCATION	PARTS NO.	DESCRIPTION
C2901	403 001 1609	CERAMIC 0.01U K 16V
C2902	403 163 8409	ELECT 47U M 16V
C2903	403 001 1609	CERAMIC 0.01U K 16V
C2904	403 001 1609	CERAMIC 0.01U K 16V
C2905	403 001 1609	CERAMIC 0.01U K 16V
C2906	403 001 1609	CERAMIC 0.01U K 16V
C2907	403 001 1609	CERAMIC 0.01U K 16V
C2908	403 163 7907	ELECT 47U M 6.3V
C2909	403 001 1609	CERAMIC 0.01U K 16V
C2910	403 001 1609	CERAMIC 0.01U K 16V
C2911	403 193 8202	ELECT 0.1U M 50V
C2912	403 001 1609	CERAMIC 0.01U K 16V
C2914	403 001 1609	CERAMIC 0.01U K 16V
C2916	403 193 8202	ELECT 0.1U M 50V
C2917	403 121 9509	CERAMIC 0.1U Z 50V
IC291	409 208 5808	IC UPC2350GS
L2901	613 015 6730	COIL,INDUCTOR 100UHK
L2902	613 015 6730	COIL,INDUCTOR 100UHK
R2901	401 012 5609	CARBON 1K JA 1/4W
R2903	401 016 4707	CARBON 22K JA 1/4W
R2904	401 016 4707	CARBON 22K JA 1/4W
R2907	401 012 3308	CARBON 10 JA 1/4W

LOCATION	PARTS NO.	DESCRIPTION
R2908	401 012 3308	CARBON 10 JA 1/4W
R2911	401 022 6702	CARBON 75 JA 1/4W

COMPL,AD-1

COMPL.NO.	613 111 8836	
C2001	403 139 2707	ELECT 1U M 50V
C2002	403 075 4506	CERAMIC 820P K 50V
C2004	403 167 6500	ELECT 33U M 6.3V
C2005	403 003 0600	CERAMIC 0.018U K 25V
C2006	403 193 8608	ELECT 0.47U M 50V
C2008	403 001 7403	CERAMIC 4700P K 16V
C2009	403 135 4002	ELECT 47U M 6.3V
C2010	403 107 9905	ELECT 10U M 16V
C2013	403 003 2406	CERAMIC 0.022U J 25V
C2016	403 109 6308	ELECT 1U M 50V
C2017	403 134 5901	ELECT 33U M 16V
C2018	403 121 3002	ELECT 4.7U M 25V
C2019	403 134 9602	ELECT 47U M 16V
C2020	403 071 6207	CERAMIC 220P K 50V
C2021	403 081 7409	POLYPRO 0.033U J 100V
C2022	403 002 1905	CERAMIC 0.01U K 25V
C2024	403 002 1905	CERAMIC 0.01U K 25V
C2025	403 003 3700	CERAMIC 0.022U Z 25V
C2051	403 069 1207	CERAMIC 1000P K 50V
C2071	403 075 4001	CERAMIC 820P J 50V
C2072	403 191 8709	ELECT 1U M 50V
C2073	403 003 8606	CERAMIC 0.039U J 25V
C2075	403 121 3002	ELECT 4.7U M 25V
D2001	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
IC201	409 133 1401	IC LA7294
L2002	613 014 3037	COIL,INDUCTOR 10MHJ
L2003	613 014 2870	COIL,INDUCTOR 560UHK
Q2001	405 024 9709	TR 2SD734-E-AA
OR	405 024 9907	TR 2SD734-F-AA
R2001	401 012 4404	CARBON 100 JA 1/4W
R2002	401 017 1705	CARBON 2.7K JA 1/4W
R2003	401 013 4106	CARBON 120 JA 1/4W
R2004	401 019 3905	CARBON 390K JA 1/4W
R2005	401 021 8905	CARBON 6.2K JA 1/4W
R2006	401 017 1705	CARBON 2.7K JA 1/4W
R2007	401 012 5609	CARBON 1K JA 1/4W
R2008	401 022 7600	CARBON 7.5K JA 1/4W
R2009	401 018 6501	CARBON 3.3M JA 1/4W
R2010	401 012 6903	CARBON 10K JA 1/4W
R2011	401 023 7401	CARBON 9.1K JA 1/4W
R2012	401 019 7705	CARBON 4.3K JA 1/4W
R2013	401 012 5609	CARBON 1K JA 1/4W
R2014	401 015 2605	CARBON 1.8K JA 1/4W
R2016	401 012 8006	CARBON 100K JA 1/4W
R2018	401 015 3701	CARBON 18K JA 1/4W
R2019	401 015 3701	CARBON 18K JA 1/4W
R2021	401 012 3308	CARBON 10 JA 1/4W
R2022	401 019 9501	CARBON 47 JA 1/4W
R2023	401 014 5102	CARBON 15K JA 1/4W
R2024	401 015 6405	CARBON 2.2 JA 1/4W
R2051	401 012 5609	CARBON 1K JA 1/4W
R2071	401 013 4106	CARBON 120 JA 1/4W
R2072	401 012 6903	CARBON 10K JA 1/4W
R2091	401 021 8905	CARBON 6.2K JA 1/4W
R2092	401 020 8302	CARBON 5.1K JA 1/4W
T2001	613 016 2205	OSC COIL 70KHZ

LOCATION	PARTS NO.	DESCRIPTION
T2001	613 094 3378	TRANS,OSC 70KHZ
VR201	613 002 0468	SEMI VR 100KB

COMPL,CP-2

COMPL.NO.	613 110 7915	

SYSTEM CONTROL CIRCUIT(SY-B)

B3001	405 018 2808	TR 2SC3402-AC
B3101	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B3102	405 018 2808	TR 2SC3402-AC
OR	405 000 3103	TR DTC114ES-DCTP
B3104	405 018 2808	TR 2SC3402-AC
OR	405 000 3103	TR DTC114ES-DCTP
C3001	403 155 2804	DL-ELECT 0.047F Z 5.5V
C3002	403 135 3500	ELECT 220U M 6.3V
C3003	403 121 9509	CERAMIC 0.1U Z 50V
C3102	403 139 2905	ELECT 2.2U M 50V
C3103	403 121 9509	CERAMIC 0.1U Z 50V
C3104	403 002 2506	CERAMIC 0.01U M 25V
C3105	403 139 0901	ELECT 33U M 6.3V
C3106	403 121 9509	CERAMIC 0.1U Z 50V
C3107	403 069 1207	CERAMIC 1000P K 50V
C3108	403 135 4002	ELECT 47U M 6.3V
C3109	403 001 1609	CERAMIC 0.01U K 16V
C3110	403 070 7809	CERAMIC 150P K 50V
C3112	403 001 1609	CERAMIC 0.01U K 16V
C3113	403 001 1609	CERAMIC 0.01U K 16V
C3114	403 001 1609	CERAMIC 0.01U K 16V
C3117	403 001 1609	CERAMIC 0.01U K 16V
C3118	403 001 1609	CERAMIC 0.01U K 16V
D3001	407 120 5807	DIODE AK04-V2
D3005	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D3101	407 063 9504	ZENER DIODE MTZJ8.2B-T-77
D3102	407 099 5303	ZENER DIODE MTZJ5.6B-T-77
D3104	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
IC301	410 095 8407	IC UPD75512GF-035-3B9
IC311	409 018 4206	IC LA6393S
IC312	409 114 4803	IC LB1641
IC313	409 032 3704	IC MN1280-R
OR	409 032 3803	IC MN1280-S
L3101	613 014 1118	COIL,INDUCTOR 18UHJ
Q3101	405 016 1100	TR 2SC2839-F-SPA-AC
Q3102	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 093 0607	TR KSC2785-Y
R3001 ⚠	402 036 4401	FUSIBLE RES 3.3 JA 1/2W
OR ⚠	402 036 3701	FUSIBLE RES 3.3 JA 1/2W
R3002	401 020 1907	CARBON 4.7K JA 1/4W
R3003	401 020 1907	CARBON 4.7K JA 1/4W
R3005	401 014 4006	CARBON 1.5K JA 1/4W
R3006	401 014 4006	CARBON 1.5K JA 1/4W
R3007	401 019 1802	CARBON 3.9K JA 1/4W
R3008	401 020 1907	CARBON 4.7K JA 1/4W
R3009	401 016 5704	CARBON 220K JA 1/4W
R3010	401 016 5704	CARBON 220K JA 1/4W
R3011	401 012 5609	CARBON 1K JA 1/4W
R3012	401 012 5609	CARBON 1K JA 1/4W
R3013	401 016 5704	CARBON 220K JA 1/4W

LOCATION	PARTS NO.	DESCRIPTION
R3014	401 012 5609	CARBON 1K JA 1/4W
R3015	401 016 5704	CARBON 220K JA 1/4W
R3017	401 020 1907	CARBON 4.7K JA 1/4W
R3018	401 016 5704	CARBON 220K JA 1/4W
R3019	401 012 6903	CARBON 10K JA 1/4W
R3020	401 023 4509	CARBON 820K JA 1/4W
R3022	401 016 5704	CARBON 220K JA 1/4W
R3024	401 023 4509	CARBON 820K JA 1/4W
R3026	401 014 4006	CARBON 1.5K JA 1/4W
R3027	401 014 5102	CARBON 15K JA 1/4W
R3028	401 012 5609	CARBON 1K JA 1/4W
R3101	401 012 6903	CARBON 10K JA 1/4W
R3102	401 014 6000	CARBON 150K JA 1/4W
R3103	401 016 0006	CARBON 20K JA 1/4W
R3104	401 016 4707	CARBON 22K JA 1/4W
R3105	401 021 4006	CARBON 56K JA 1/4W
R3106	401 023 4509	CARBON 820K JA 1/4W
R3107	401 017 3709	CARBON 270K JA 1/4W
R3108	401 017 2702	CARBON 27K JA 1/4W
R3109	401 016 3700	CARBON 2.2K JA 1/4W
R3110	401 018 4804	CARBON 33K JA 1/4W
R3111	401 016 4707	CARBON 22K JA 1/4W
R3112	401 012 6903	CARBON 10K JA 1/4W
R3113	401 016 4707	CARBON 22K JA 1/4W
R3114	401 012 6903	CARBON 10K JA 1/4W
R3115	401 012 6903	CARBON 10K JA 1/4W
R3116	401 012 6903	CARBON 10K JA 1/4W
R3117	401 022 7105	CARBON 750 JA 1/4W
R3118	401 022 7105	CARBON 750 JA 1/4W
R3119	401 020 1907	CARBON 4.7K JA 1/4W
R3120	401 020 2805	CARBON 47K JA 1/4W
R3121	401 016 4707	CARBON 22K JA 1/4W
R3122	401 012 5609	CARBON 1K JA 1/4W
R3123	401 023 2703	CARBON 8.2K JA 1/4W
R3124	401 016 3700	CARBON 2.2K JA 1/4W
R3125	401 012 5609	CARBON 1K JA 1/4W
R3126	401 018 2701	CARBON 330 JA 1/4W
R3127	401 016 2505	CARBON 220 JA 1/4W
R3129	401 016 5704	CARBON 220K JA 1/4W
R3130	401 017 2702	CARBON 27K JA 1/4W
R3131	401 018 4804	CARBON 33K JA 1/4W
R3132	401 018 4804	CARBON 33K JA 1/4W
R3135	401 012 6903	CARBON 10K JA 1/4W
R3137	401 020 1907	CARBON 4.7K JA 1/4W
R3138	401 012 5609	CARBON 1K JA 1/4W
R3139	401 016 0402	CARBON 200K JA 1/4W
R3140	401 012 5609	CARBON 1K JA 1/4W
R3141	401 016 0402	CARBON 200K JA 1/4W
R3142	401 012 5609	CARBON 1K JA 1/4W
R3143	401 020 1907	CARBON 4.7K JA 1/4W
R3144	401 020 1907	CARBON 4.7K JA 1/4W
R3145	401 020 1907	CARBON 4.7K JA 1/4W
R3146	401 020 1907	CARBON 4.7K JA 1/4W
R3153	401 012 5609	CARBON 1K JA 1/4W
R3154	401 012 5609	CARBON 1K JA 1/4W
R3155	401 012 5609	CARBON 1K JA 1/4W
R3156	401 012 5609	CARBON 1K JA 1/4W
R3202	401 020 1907	CARBON 4.7K JA 1/4W
R3203	401 020 1907	CARBON 4.7K JA 1/4W
R3206	401 016 0006	CARBON 20K JA 1/4W
R3207	401 017 1705	CARBON 2.7K JA 1/4W
R3209	401 020 1907	CARBON 4.7K JA 1/4W
XF301	613 097 9698	RESONATOR,CERAMIC 4.0MHZ
OR	613 108 2496	RESONATOR,CERAMIC 4.0MHZ

SERVO CIRCUIT(SV-B)

LOCATION	PARTS NO.	DESCRIPTION
B3506	405 018 2501	TR 2SC3399-AC
B3506	405 000 6104	TR DTC144ES-DCTP
B3507	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
B3512	405 018 2501	TR 2SC3399-AC
OR	405 000 6104	TR DTC144ES-DCTP
C3501	403 057 6801	POLYESTER 0.012U J 50V
C3502	403 139 1007	ELECT 47U M 6.3V
C3503	403 121 9509	CERAMIC 0.1U Z 50V
C3504	403 071 6207	CERAMIC 220P K 50V
C3505	403 062 9101	POLYESTER 6800P J 50V
C3506	403 059 6502	POLYESTER 0.022U K 50V
C3507	403 002 8508	CERAMIC 0.015U K 25V
C3508	403 001 8806	CERAMIC 6800P K 16V
C3509	403 002 8508	CERAMIC 0.015U K 25V
C3510	403 145 8601	ELECT 22U M 16V
OR	403 042 8803	ELECT 22U M 16V
C3511	403 145 8601	ELECT 22U M 16V
OR	403 042 8803	ELECT 22U M 16V
C3512	403 063 0008	POLYESTER 6800P K 50V
C3513	403 168 6103	MT-POLYEST 0.1U J 50V
C3514	403 001 5003	CERAMIC 2200P K 16V
C3515	403 001 3801	CERAMIC 1500P K 16V
C3516	403 001 8806	CERAMIC 6800P K 16V
C3517	403 145 8601	ELECT 22U M 16V
OR	403 042 8803	ELECT 22U M 16V
C3518	403 145 8601	ELECT 22U M 16V
OR	403 042 8803	ELECT 22U M 16V
C3519	403 175 0903	MT-POLYEST 0.12U J 50V
C3523	403 068 9402	CERAMIC 100P K 50V
C3525	403 069 1207	CERAMIC 1000P K 50V
C3526	403 139 2400	ELECT 0.22U M 50V
C3527	403 001 1609	CERAMIC 0.01U K 16V
C3528	403 139 2707	ELECT 1U M 50V
C3529	403 004 4607	CERAMIC 0.068U K 25V
C3530	403 139 1502	ELECT 10U M 16V
C3531	403 139 3001	ELECT 3.3U M 50V
C3532	403 001 5003	CERAMIC 2200P K 16V
C3533	403 069 1207	CERAMIC 1000P K 50V
C3534	403 159 0806	NP-ELECT 33U M 6.3V
C3535	403 069 1207	CERAMIC 1000P K 50V
C3536	403 060 7505	POLYESTER 0.033U J 50V
C3537	403 139 1007	ELECT 47U M 6.3V
C3540	403 063 7700	POLYESTER 0.082U K 50V
C3541	403 070 4105	CERAMIC 120P K 50V
C3556	403 086 2904	NP-ELECT 1U M 50V
C3557	403 001 1609	CERAMIC 0.01U K 16V
C3558	403 086 2904	NP-ELECT 1U M 50V
C3596	403 030 2004	CERAMIC 6.8P K 50V
D3501	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D3502	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D3503	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D3504	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D3516	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D3534	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D3535	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D3536	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D3540	407 012 4406	DIODE 1SS133-T-77
OR	407 007 9904	DIODE GMA01-BT
D3541	407 012 4406	DIODE 1SS133-T-77

LOCATION	PARTS NO.	DESCRIPTION
D3541	407 007 9904	DIODE GMA01-BT
IC351	409 155 3308	IC LC7417-8070
IC352	409 178 3507	IC LA7123
Q3501	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 093 0607	TR KSC2785-Y
R3503	401 016 4707	CARBON 22K JA 1/4W
R3504	401 016 4707	CARBON 22K JA 1/4W
R3505	401 015 4609	CARBON 180K JA 1/4W
R3509	401 020 1907	CARBON 4.7K JA 1/4W
R3511	401 012 6903	CARBON 10K JA 1/4W
R3512	401 012 8006	CARBON 100K JA 1/4W
R3513	401 012 8006	CARBON 100K JA 1/4W
R3514	401 018 5702	CARBON 330K JA 1/4W
R3515	401 014 5102	CARBON 15K JA 1/4W
R3516	401 014 6000	CARBON 150K JA 1/4W
R3517	401 014 6000	CARBON 150K JA 1/4W
R3518	401 012 6903	CARBON 10K JA 1/4W
R3519	401 020 2805	CARBON 47K JA 1/4W
R3520	401 020 2805	CARBON 47K JA 1/4W
R3521	401 018 5702	CARBON 330K JA 1/4W
R3522	401 014 6000	CARBON 150K JA 1/4W
R3523	401 017 2702	CARBON 27K JA 1/4W
R3527	401 014 6000	CARBON 150K JA 1/4W
R3528	401 012 8006	CARBON 100K JA 1/4W
R3529	401 012 6903	CARBON 10K JA 1/4W
R3533	401 016 5704	CARBON 220K JA 1/4W
R3534	401 016 3700	CARBON 2.2K JA 1/4W
R3535	401 016 3700	CARBON 2.2K JA 1/4W
R3539	401 020 9200	CARBON 510K JA 1/4W
R3540	401 016 5704	CARBON 220K JA 1/4W
R3541	401 018 7508	CARBON 360 JA 1/4W
R3542	401 020 7800	CARBON 510 JA 1/4W
R3543	401 020 7800	CARBON 510 JA 1/4W
R3548	401 012 6903	CARBON 10K JA 1/4W
R3550	401 012 6903	CARBON 10K JA 1/4W
R3559	401 012 6903	CARBON 10K JA 1/4W
R3564	401 016 3700	CARBON 2.2K JA 1/4W
R3590	401 013 6308	CARBON 12K JA 1/4W
R3593	401 018 5702	CARBON 330K JA 1/4W
R3596	401 012 5609	CARBON 1K JA 1/4W

COMPL.PW-1

LOCATION	PARTS NO.	DESCRIPTION
COMPL.NO.	613 111 8898	
	613 118 1618	HOLDER.FUSE
	613 118 1311	COVER.FUSE
C5101	403 121 9400	MT-POLYEST 0.82U J 63V
C5102	403 161 0009	ELECT 2200U M 50V
OR	403 154 8203	ELECT 2200U M 50V
C5105	403 157 0006	ELECT 47U M 63V
C5106	403 156 9703	ELECT 22U M 63V
C5108	403 160 7207	ELECT 470U M 16V
C5109	404 049 6908	ELECT 1000U M 10V
C5110	403 044 1703	ELECT 470U M 16V
C5111	403 135 4507	ELECT 1000U M 10V
C5112	403 129 5800	ELECT 22U M 35V
C5113	403 002 4708	CERAMIC 0.1U Z 25V
C5115	403 125 5606	ELECT 100U M 16V
D5101	407 139 6109	DIODE DBF40E-C2-M1
OR	407 139 6000	DIODE DBF40C-C2-M1
D5102	407 078 2705	DIODE 1SS244-T-77
D5103	407 078 2705	DIODE 1SS244-T-77
D5110	407 050 9104	ZENER DIODE GZB16C

LOCATION	PARTS NO.	DESCRIPTION
D5111	407 050 8107	ZENER DIODE GZB10C
F5001 ⚠	423 003 3708	FUSE 250V 0.4A
F5101 ⚠	423 004 6708	FUSE 250V0.315A
IC511	409 214 8909	IC STK7576
IC512	409 214 8800	IC SI-3120C
L5001	613 080 0664	LF CHOKE
OR	613 119 9828	COIL.LINE FILTER
L5101	613 013 0730	LF CHOKE
L5102	613 013 0730	LF CHOKE
L5103	613 110 4198	COIL.INDUCTOR 10UH K
L5110	613 017 0354	CORE
R5102	401 008 7402	CARBON 2.2K JA 1/2W
R5103	401 057 3004	OXIDE-MT 0.22 JA 1W
R5104	401 057 4001	OXIDE-MT 0.33 JA 1W

IF PACK

LOCATION	PARTS NO.	DESCRIPTION
COMPL.NO.	613 112 4585	
C6101	403 024 2300	CERAMIC 39P J 50V
C6102	403 008 7604	CERAMIC 10P D 50V
C6103	403 026 3008	CERAMIC 47P J 50V
C6104	403 069 9500	CERAMIC 0.01U Z 50V
C6105	403 069 9500	CERAMIC 0.01U Z 50V
C6106	403 069 9500	CERAMIC 0.01U Z 50V
C6107	403 069 9500	CERAMIC 0.01U Z 50V
C6108	403 032 5409	CERAMIC 8P C 50V
C6109	403 042 3006	ELECT 100U M 16V
C6110	403 069 9500	CERAMIC 0.01U Z 50V
C6111	403 068 0409	CERAMIC 0.1U Z 25V
C6112	403 069 1702	CERAMIC 1000P K 50V
C6113	403 050 0509	ELECT 2.2U M 50V
C6114	403 069 9500	CERAMIC 0.01U Z 50V
C6115	403 022 8403	CERAMIC 33P J 50V
C6116	403 069 9500	CERAMIC 0.01U Z 50V
C6117	403 048 4809	ELECT 0.33U M 50V
C6118	403 069 9500	CERAMIC 0.01U Z 50V
C6119	403 068 0409	CERAMIC 0.1U Z 25V
C6120	403 068 0409	CERAMIC 0.1U Z 25V
C6123	403 069 9500	CERAMIC 0.01U Z 50V
C6124	403 042 3006	ELECT 100U M 16V
C6125	403 068 0409	CERAMIC 0.1U Z 25V
C6130	403 069 9500	CERAMIC 0.01U Z 50V
C6131	403 069 9500	CERAMIC 0.01U Z 50V
C6132	403 010 8606	CERAMIC 12P J 50V
C6133	403 030 7405	CERAMIC 68P J 50V
C6134	403 068 0409	CERAMIC 0.1U Z 25V
C6136	403 014 3409	CERAMIC 18P J 50V
C6137	403 188 1805	CERAMIC 93P H 50V
C6138	403 048 6902	ELECT 0.47U M 50V
C6139	403 022 8403	CERAMIC 33P J 50V
C6140	403 049 0800	ELECT 1U M 50V
C6141	403 008 7604	CERAMIC 10P D 50V
C6143	403 070 9803	CERAMIC 0.015U K 50V
C6144	403 047 0604	ELECT 4.7U M 25V
C6155	403 069 9500	CERAMIC 0.01U Z 50V
D6101	407 053 8906	ZENER DIODE MTZ9.1C
D6102	407 075 8205	DIODE MA77-4B-TX
IC611	409 036 0105	IC M51366SP
J6107	401 035 4108	MT-GLAZE 0.000 ZA 1/8W
J6108	401 035 4108	MT-GLAZE 0.000 ZA 1/8W
J6109	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
J6112	401 037 5004	MT-GLAZE 0.000 ZA 1/10W

LOCATION	PARTS NO.	DESCRIPTION
J6116	401 108 2604	M-GLAZ 0 1/10W J
J6117	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
J6123	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
J6124	401 035 4108	MT-GLAZE 0.000 ZA 1/8W
L6101	613 119 1600	TRANS.IF
L6102	613 014 0753	COIL.INDUCTOR 1.5UHM
L6103	613 014 0722	COIL.INDUCTOR 0.82UHM
L6104	613 014 0807	COIL.INDUCTOR 3.9UHK
L6105	613 014 0913	COIL.INDUCTOR 33UHK
L6106	613 095 2462	TRANS.IF
L6107	613 103 3979	TRANS.IF
L6108	613 014 0838	COIL.INDUCTOR 6.8UHK
L6109	613 088 8396	TRANS.IF
L6110	613 098 6047	COIL.CHOKE 1.5UH
L6111	613 014 0692	COIL.INDUCTOR 0.47UHM
Q6101	405 090 3304	TR 2SC3838K-ADP-T96
Q6102	405 004 3901	TR 2SA608-E-NP
Q6103	405 090 3304	TR 2SC3838K-ADP-T96
Q6105	405 015 8407	TR 2SC2812-L5-TB
Q6106	405 015 8407	TR 2SC2812-L5-TB
R6101	402 023 4506	FUSIBLE RES 27 JA 1/2W
R6103	401 038 7700	MT-GLAZE 5.6K JA 1/10W
R6104	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R6105	401 038 0503	MT-GLAZE 22 JA 1/10W
R6106	401 037 9101	MT-GLAZE 180 JA 1/10W
R6107	401 037 9101	MT-GLAZE 180 JA 1/10W
R6109	401 038 3603	MT-GLAZE 3.3K JA 1/10W
R6110	401 038 3801	MT-GLAZE 330K JA 1/10W
R6111	401 037 9309	MT-GLAZE 18K JA 1/10W
R6112	401 038 3801	MT-GLAZE 330K JA 1/10W
R6113	401 038 7809	MT-GLAZE 56K JA 1/10W
R6114	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R6115	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R6116	401 038 7700	MT-GLAZE 5.6K JA 1/10W
R6117	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R6118	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R6119	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R6120	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R6121	401 039 0601	MT-GLAZE 820K JA 1/10W
R6122	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R6123	401 038 3504	MT-GLAZE 330 JA 1/10W
R6124	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R6125	401 038 3504	MT-GLAZE 330 JA 1/10W
R6126	401 037 5400	MT-GLAZE 1K JA 1/10W
R6127	401 036 8105	MT-GLAZE 470 JA 1/8W
R6128	401 037 1709	MT-GLAZE 68 JA 1/8W
R6129	401 037 5202	MT-GLAZE 100 JA 1/10W
R6130	401 038 3702	MT-GLAZE 33K JA 1/10W
R6136	401 038 6307	MT-GLAZE 470 JA 1/10W
R6137	401 038 7205	MT-GLAZE 5.1K JA 1/10W
R6138	401 038 6208	MT-GLAZE 47 JA 1/10W
R6139	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R6140	401 037 5608	MT-GLAZE 10K JA 1/10W
R6141	401 037 5608	MT-GLAZE 10K JA 1/10W
R6142	401 037 5400	MT-GLAZE 1K JA 1/10W
R6144	401 037 5202	MT-GLAZE 100 JA 1/10W
R6145	401 039 0304	MT-GLAZE 820 JA 1/10W
R6146	401 038 6208	MT-GLAZE 47 JA 1/10W
R6147	401 038 6505	MT-GLAZE 47K JA 1/10W
R6148	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R6149	401 038 2002	MT-GLAZE 270 JA 1/10W
R6152	401 037 5400	MT-GLAZE 1K JA 1/10W
R6153	401 038 5003	MT-GLAZE 390 JA 1/10W
R6154	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R6155	401 037 5400	MT-GLAZE 1K JA 1/10W
R6158	401 038 9209	MT-GLAZE 6.8K JA 1/10W

LOCATION	PARTS NO.	DESCRIPTION
R6159	401 037 9309	MT-GLAZE 18K JA 1/10W
R6160	401 037 5400	MT-GLAZE 1K JA 1/10W
R6166	401 038 4907	MT-GLAZE 39 JA 1/10W
R6167	401 038 0602	MT-GLAZE 220 JA 1/10W
VR611	613 002 1137	SEMI VR 1KB
X6101	421 002 6508	SAW F TSF1334L
X6102	422 000 8204	SAW F SAF33.0MC70Z
X6104	613 119 3918	TRAP.5.5MHZ
X6105	613 088 8372	FILTER.5.85M
X6108	613 084 1704	FILTER
X6111	613 086 1191	DISCR.CERAMIC
COMPL.TN-5		
COMPL.NO.	613 097 9070	
B6703	405 018 2501	TR 2SC3399-AC
B6704	405 018 2501	TR 2SC3399-AC
B6705	405 003 7603	TR 2SA1345-AC
B6706	405 018 2501	TR 2SC3399-AC
B6707	405 018 2501	TR 2SC3399-AC
B6708	405 003 7603	TR 2SA1345-AC
B6709	405 018 2501	TR 2SC3399-AC
B6710	405 018 2501	TR 2SC3399-AC
B6711	405 003 7603	TR 2SA1345-AC
B6712	405 018 2501	TR 2SC3399-AC
C6701	403 001 2309	CERAMIC 0.01U N 16V
C6702	403 001 2309	CERAMIC 0.01U N 16V
C6703	403 048 6902	ELECT 0.47U M 50V
C6704	403 048 6902	ELECT 0.47U M 50V
C6705	403 001 2309	CERAMIC 0.01U N 16V
C6706	403 001 2309	CERAMIC 0.01U N 16V
C6707	403 014 0200	CERAMIC 18P J 50V
C6708	403 028 1606	CERAMIC 56P J 50V
C6709	403 014 0200	CERAMIC 18P J 50V
C6710	403 048 6902	ELECT 0.47U M 50V
C6711	403 001 2309	CERAMIC 0.01U N 16V
C6714	403 001 2309	CERAMIC 0.01U N 16V
C6715	403 001 2309	CERAMIC 0.01U N 16V
C6716	403 121 9509	CERAMIC 0.1U Z 50V
C6717	403 121 9509	CERAMIC 0.1U Z 50V
C6718	403 009 3001	CERAMIC 100P J 50V
C6719	403 009 3001	CERAMIC 100P J 50V
C6720	403 001 2309	CERAMIC 0.01U N 16V
C6721	403 038 2006	ELECT 100U M 6.3V
C6722	403 012 5900	CERAMIC 15P J 50V
C6723	403 012 5900	CERAMIC 15P J 50V
C6724	403 012 5900	CERAMIC 15P J 50V
C6725	403 014 0200	CERAMIC 18P J 50V
C6726	403 028 1606	CERAMIC 56P J 50V
C6727	403 023 9607	CERAMIC 39P J 50V
C6728	403 048 6902	ELECT 0.47U M 50V
C6729	403 001 2309	CERAMIC 0.01U N 16V
C6730	403 001 2309	CERAMIC 0.01U N 16V
C6731	403 121 9509	CERAMIC 0.1U Z 50V
C6732	403 121 9509	CERAMIC 0.1U Z 50V
C6733	403 001 2309	CERAMIC 0.01U N 16V
C6734	403 038 9005	ELECT 33U M 6.3V
C6735	403 041 9405	ELECT 10U M 16V
C6738	403 043 9601	ELECT 47U M 16V
C6739	403 001 2309	CERAMIC 0.01U N 16V
C6740	403 001 2309	CERAMIC 0.01U N 16V
C6741	403 043 9601	ELECT 47U M 16V
C6742	403 017 7404	CERAMIC 22P J 50V
C6743	403 017 7404	CERAMIC 22P J 50V
C6744	403 001 2309	CERAMIC 0.01U N 16V
C6745	403 038 9708	ELECT 330U M 6.3V

LOCATION	PARTS NO.	DESCRIPTION
C6746	403 062 8302	POLYESTER 680P J 50V
C6747	403 039 2609	ELECT 47U M 6.3V
C6748	403 087 3801	STYRENE 1200P J 50V
C6749	403 038 6707	ELECT 220U M 6.3V
C6750	403 087 3801	STYRENE 1200P J 50V
C6751	403 038 2006	ELECT 100U M 6.3V
C6752	403 039 2609	ELECT 47U M 6.3V
C6753	403 062 8302	POLYESTER 680P J 50V
C6754	403 046 2104	ELECT 3.3U M 25V
C6755	403 046 2104	ELECT 3.3U M 25V
C6756	403 046 2104	ELECT 3.3U M 25V
C6757	403 046 2104	ELECT 3.3U M 25V
C6758	403 067 5603	MT-COMPO 0.1U J 50V
C6759	403 067 5603	MT-COMPO 0.1U J 50V
C6760	403 046 2104	ELECT 3.3U M 25V
C6761	403 046 2104	ELECT 3.3U M 25V
C6762	403 048 6902	ELECT 0.47U M 50V
C6763	403 041 9405	ELECT 10U M 16V
C6764	403 041 9405	ELECT 10U M 16V
C6765	403 041 9405	ELECT 10U M 16V
C6766	403 047 0604	ELECT 4.7U M 25V
C6767	403 085 4305	NP-ELECT 10U M 16V
C6768	403 041 9405	ELECT 10U M 16V
C6769	403 001 2309	CERAMIC 0.01U N 16V
C6770	403 001 2309	CERAMIC 0.01U N 16V
C6771	403 043 9601	ELECT 47U M 16V
C6772	403 001 2309	CERAMIC 0.01U N 16V
C6773	403 038 2006	ELECT 100U M 6.3V
C6774	403 085 4305	NP-ELECT 10U M 16V
C6775	403 069 0309	CERAMIC 1000P J 50V
CT671	613 002 6255	TRIMMER
D6701	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6702	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6703	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6704	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6705	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6706	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6707	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6708	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D6710	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
IC671	409 161 5204	IC TA8662N
IC672	409 089 6109	IC LC3664NL-12
OR	410 063 3502	IC CXK5864BP-12L
OR	410 064 8803	IC CXK5864BP-12LL
IC673	409 161 5303	IC TC6011N
IC674	409 141 9109	IC TA78L010AP
IC675	409 163 2102	IC TD6710AN
IC676	409 018 5203	IC LA6462D
IC677	409 051 3006	IC TC4053BP
IC678	409 018 5203	IC LA6462D
L6701	613 015 2596	HF CHOKE 820UH J
L6702	613 015 2596	HF CHOKE 820UH J
L6703	613 014 0777	COIL.INDUCTOR 2.2UHM
L6704	613 014 0777	COIL.INDUCTOR 2.2UHM
Q6701	405 019 2005	TR 2SC536-E-SPA-AC

LOCATION	PARTS NO.	DESCRIPTION
Q6701	405 019 2807	TR 2SC536-F-SPA-AC
Q6702	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
Q6703	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4601	TR 2SA608-F-SPA-AC
R6701	401 012 4404	CARBON 100 JA 1/4W
R6702	401 017 0708	CARBON 270 JA 1/4W
R6703	401 012 6903	CARBON 10K JA 1/4W
R6704	401 016 3700	CARBON 2.2K JA 1/4W
R6705	401 023 0600	CARBON 82 JA 1/4W
R6706	401 016 5704	CARBON 220K JA 1/4W
R6707	401 014 6000	CARBON 150K JA 1/4W
R6708	401 022 1806	CARBON 680 JA 1/4W
R6709	401 020 7800	CARBON 510 JA 1/4W
R6710	401 012 5609	CARBON 1K JA 1/4W
R6711	401 019 2908	CARBON 39K JA 1/4W
R6712	401 012 5609	CARBON 1K JA 1/4W
R6713	401 020 0702	CARBON 470 JA 1/4W
R6714	401 019 2908	CARBON 39K JA 1/4W
R6715	401 012 5609	CARBON 1K JA 1/4W
R6716	401 020 2805	CARBON 47K JA 1/4W
R6717	401 020 2805	CARBON 47K JA 1/4W
R6718	401 020 2805	CARBON 47K JA 1/4W
R6719	401 020 2805	CARBON 47K JA 1/4W
R6720	401 020 2805	CARBON 47K JA 1/4W
R6721	401 020 2805	CARBON 47K JA 1/4W
R6722	401 022 4005	CARBON 68K JA 1/4W
R6723	401 018 4804	CARBON 33K JA 1/4W
R6724	401 018 4804	CARBON 33K JA 1/4W
R6725	401 019 1802	CARBON 3.9K JA 1/4W
R6726	401 019 0904	CARBON 390 JA 1/4W
R6727	401 016 3700	CARBON 2.2K JA 1/4W
R6728	401 012 6903	CARBON 10K JA 1/4W
R6729	401 019 1802	CARBON 3.9K JA 1/4W
R6730	401 019 0904	CARBON 390 JA 1/4W
R6731	401 016 3700	CARBON 2.2K JA 1/4W
R6732	401 012 6903	CARBON 10K JA 1/4W
R6733	401 017 2702	CARBON 27K JA 1/4W
R6734	401 022 3008	CARBON 6.8K JA 1/4W
R6735	401 017 2702	CARBON 27K JA 1/4W
R6736	401 022 3008	CARBON 6.8K JA 1/4W
R6738	401 020 2805	CARBON 47K JA 1/4W
R6739	401 012 5609	CARBON 1K JA 1/4W
R6740	401 020 2805	CARBON 47K JA 1/4W
R6741	401 019 1802	CARBON 3.9K JA 1/4W
R6742	401 020 2805	CARBON 47K JA 1/4W
R6743	401 020 2805	CARBON 47K JA 1/4W
R6744	401 020 2805	CARBON 47K JA 1/4W
R6745	401 012 6903	CARBON 10K JA 1/4W
R6746	401 012 6903	CARBON 10K JA 1/4W
R6747	401 020 1907	CARBON 4.7K JA 1/4W
R6748	401 020 1907	CARBON 4.7K JA 1/4W
R6749	401 012 6903	CARBON 10K JA 1/4W
R6750	401 012 6903	CARBON 10K JA 1/4W
R6751	401 012 6903	CARBON 10K JA 1/4W
R6752	401 019 1802	CARBON 3.9K JA 1/4W
R6753	401 019 1802	CARBON 3.9K JA 1/4W
R6754	401 020 2805	CARBON 47K JA 1/4W
R6755	401 020 2805	CARBON 47K JA 1/4W
R6756	401 012 5609	CARBON 1K JA 1/4W
X6701	613 084 3241	OSC CRYSTAL.5.85MHZ
X6702	613 084 3234	OSC CRYSTAL.5.824MHZ
X6703	613 084 3258	RESONATOR.CERAMIC 16.93M
XF671	613 084 3166	FILTER.5.85MHZ
XF672	613 088 3537	FILTER.14KHZ L.P.F
OR	613 112 2260	FILTER.14KHZ L.P.F

LOCATION	PARTS NO.	DESCRIPTION
XF673	613 088 3537	FILTER,14KHZ L.P.F
OR	613 112 2260	FILTER,14KHZ L.P.F
COMPL,TN-7		
COMPL.NO.	613 109 4420	
B6901	405 018 1900	TR 2SC3395-TB
OR	405 029 3504	TR DTC144EK-T96
C6901	403 068 0409	CERAMIC 0.1U Z 25V
C6902	403 189 2405	ELECT 10U M 16V
C6903	403 072 3403	CERAMIC 0.022U Z 50V
C6904	403 193 8400	ELECT 0.22U M 50V
C6921	403 068 0409	CERAMIC 0.1U Z 25V
D6901	407 004 0706	DIODE DCB015-TB
OR	407 003 3609	DIODE DAN202K-T-96
D6902	407 003 5108	DIODE DA204K-T96
J6901	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
Q6901	405 015 8308	TR 2SC2812-L4-TB
OR	405 015 8407	TR 2SC2812-L5-TB
OR	405 014 4400	TR 2SC2412K-T96-Q
OR	405 014 4509	TR 2SC2412K-T96-R
Q6902	405 030 7201	TR 2SA1338-4-TB
OR	405 030 7300	TR 2SA1338-5-TB
Q6903	405 015 8308	TR 2SC2812-L4-TB
OR	405 015 8407	TR 2SC2812-L5-TB
OR	405 014 4400	TR 2SC2412K-T96-Q
OR	405 014 4509	TR 2SC2412K-T96-R
R6901	401 037 5400	MT-GLAZE 1K JA 1/10W
R6902	401 038 3504	MT-GLAZE 330 JA 1/10W
R6903	401 038 8509	MT-GLAZE 620 JA 1/10W
R6904	401 037 5608	MT-GLAZE 10K JA 1/10W
R6905	401 038 3801	MT-GLAZE 330K JA 1/10W
R6906	401 037 5608	MT-GLAZE 10K JA 1/10W
R6907	401 038 3603	MT-GLAZE 3.3K JA 1/10W
R6908	401 039 0205	MT-GLAZE 82 JA 1/10W
R6909	401 037 5400	MT-GLAZE 1K JA 1/10W
R6910	401 038 7106	MT-GLAZE 510 JA 1/10W
R6911	401 038 7700	MT-GLAZE 5.6K JA 1/10W
R6912	401 038 5102	MT-GLAZE 3.9K JA 1/10W
T6901	613 109 0958	TRANS.IF
OR	613 109 0965	TRANS.IF
COMPL,TM-1		
COMPL.NO.	613 116 6349	
	613 079 0774	HOLDER,VFD
	613 102 5462	HOLDER,LED
A7101	613 084 3203	FLUORESCENT TUBE
B7184	405 000 0300	TR DTA114EF
B7185	405 000 0300	TR DTA114EF
B7186	405 000 0300	TR DTA114EF
B7189	405 000 2809	TR DTC114EF
B7190	405 000 2809	TR DTC114EF
C7102	403 014 2501	CERAMIC 18P J 50V
C7103	403 017 0108	CERAMIC 20P J 50V
C7104	403 001 1609	CERAMIC 0.01U K 16V
C7105	403 139 1601	ELECT 22U M 16V
C7106	403 001 1609	CERAMIC 0.01U K 16V
C7107	403 001 1609	CERAMIC 0.01U K 16V
C7108	403 139 2608	ELECT 0.47U M 50V

LOCATION	PARTS NO.	DESCRIPTION
C7111	403 121 9509	CERAMIC 0.1U Z 50V
C7113	403 139 1502	ELECT 10U M 16V
D7101	407 120 5807	DIODE AK04-V2
D7103	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7104	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7105	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7107	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7108	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7110	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7118	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7120	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7123	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7184	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7185	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7186	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7187	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7190	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7191	407 007 9904	DIODE GMA01-BT
OR	407 012 4406	DIODE 1SS133-T-77
D7771	407 141 0300	LED EBG3433S
D7772	407 078 2903	LED BR3433S
D7773	407 078 2903	LED BR3433S
IC711	409 214 4000	IC M50959-292SP
IC712	409 032 3308	IC MN1280-L
R7101	401 012 9201	CARBON 1M JA 1/4W
R7102	401 110 6201	CARBON 10M JA 1/4W
R7103	401 018 5702	CARBON 330K JA 1/4W
R7104	401 012 5609	CARBON 1K JA 1/4W
R7106	401 012 5609	CARBON 1K JA 1/4W
R7108	401 012 5609	CARBON 1K JA 1/4W
R7110	401 012 5609	CARBON 1K JA 1/4W
R7113	401 012 5609	CARBON 1K JA 1/4W
R7116	401 016 4707	CARBON 22K JA 1/4W
R7117	401 012 6903	CARBON 10K JA 1/4W
R7118	401 012 5609	CARBON 1K JA 1/4W
R7119	401 012 5609	CARBON 1K JA 1/4W
R7122	401 012 5609	CARBON 1K JA 1/4W
R7123	401 012 5609	CARBON 1K JA 1/4W
R7124	401 018 4804	CARBON 33K JA 1/4W
R7133	401 018 5702	CARBON 330K JA 1/4W
R7190	401 016 7401	CARBON 240 JA 1/4W
R7194	401 019 0904	CARBON 390 JA 1/4W
R7195	401 019 0904	CARBON 390 JA 1/4W
RB711	613 079 5908	R-NETWORK,10KX7
OR	613 017 2884	RESISTOR PACK 10K X7 J
RB712	613 079 5878	R-NETWORK,10KX4
OR	613 017 2853	RESISTOR PACK 10K X4 J
RR711	613 094 0421	IR RECEIVER PACK
S7101	613 006 3649	PUSH SWITCH,PLAY

LOCATION	PARTS NO.	DESCRIPTION
S7101	613 079 4130	SW.PUSH.PLAY
OR	613 092 0751	SW.PUSH.PLAY
OR	613 092 1734	SW.PUSH.PLAY
S7102	613 006 3649	PUSH SWITCH.STOP
OR	613 079 4130	SW.PUSH.STOP
OR	613 092 0751	SW.PUSH.STOP
OR	613 092 1734	SW.PUSH.STOP
S7103	613 006 3649	PUSH SWITCH.PAUSE
OR	613 079 4130	SW.PUSH.PAUSE
OR	613 092 0751	SW.PUSH.PAUSE
OR	613 092 1734	SW.PUSH.PAUSE
S7106	613 006 3649	PUSH SWITCH.UP
OR	613 079 4130	SW.PUSH.UP
OR	613 092 0751	SW.PUSH.UP
OR	613 092 1734	SW.PUSH.UP
S7108	613 006 3649	PUSH SWITCH.TR+/FT+
OR	613 079 4130	SW.PUSH.TR+/FT+
OR	613 092 0751	SW.PUSH.TR+/FT+
OR	613 092 1734	SW.PUSH.TR+/FT+
S7113	613 006 3649	PUSH SWITCH.REC
OR	613 079 4130	SW.PUSH.REC
OR	613 092 0751	SW.PUSH.REC
OR	613 092 1734	SW.PUSH.REC
S7115	613 006 3649	PUSH SWITCH.POWER
OR	613 079 4130	SW.PUSH.POWER
OR	613 092 0751	SW.PUSH.POWER
OR	613 092 1734	SW.PUSH.POWER
S7118	613 006 3649	PUSH SWITCH.DOWN
OR	613 079 4130	SW.PUSH.DOWN
OR	613 092 0751	SW.PUSH.DOWN
OR	613 092 1734	SW.PUSH.DOWN
S7120	613 006 3649	PUSH SWITCH.TR-/FT-
OR	613 079 4130	SW.PUSH.TR-/FT-
OR	613 092 0751	SW.PUSH.TR-/FT-
OR	613 092 1734	SW.PUSH.TR-/FT-
S7125	613 006 3649	PUSH SWITCH.REW
OR	613 079 4130	SW.PUSH.REW
OR	613 092 0751	SW.PUSH.REW
OR	613 092 1734	SW.PUSH.REW
S7126	613 006 3649	PUSH SWITCH.FF
OR	613 079 4130	SW.PUSH.FF
OR	613 092 0751	SW.PUSH.FF
OR	613 092 1734	SW.PUSH.FF
S7129	613 006 3649	PUSH SWITCH.PRESET
OR	613 079 4130	SW.PUSH.PRESET
OR	613 092 0751	SW.PUSH.PRESET
OR	613 092 1734	SW.PUSH.PRESET
S7130	613 006 3649	PUSH SWITCH.OK
OR	613 079 4130	SW.PUSH.OK
OR	613 092 0751	SW.PUSH.OK
OR	613 092 1734	SW.PUSH.OK
S7137	613 006 3649	PUSH SWITCH.ALL CLEAR
OR	613 079 4130	SW.PUSH.ALL CLEAR
OR	613 092 0751	SW.PUSH.ALL CLEAR
OR	613 092 1734	SW.PUSH.ALL CLEAR
S7182	613 103 3856	SLIDE SWITCH.NICAM
X7101	613 089 4069	RESONATOR.CERAMIC 6MHZ
OR	613 108 9570	RESONATOR.CERAMIC 6MHZ
X7102	613 109 0972	OSC.CRYSTAL 32KHZ

COMPL.TM-2

COMPL.NO. 613 112 3625

LOCATION	PARTS NO.	DESCRIPTION
C7188	403 001 1609	CERAMIC 0.01U K 16V
C7190	403 001 1609	CERAMIC 0.01U K 16V
L7181	613 014 1200	COIL.INDUCTOR 100UHJ
L7182	613 014 1200	COIL.INDUCTOR 100UHJ

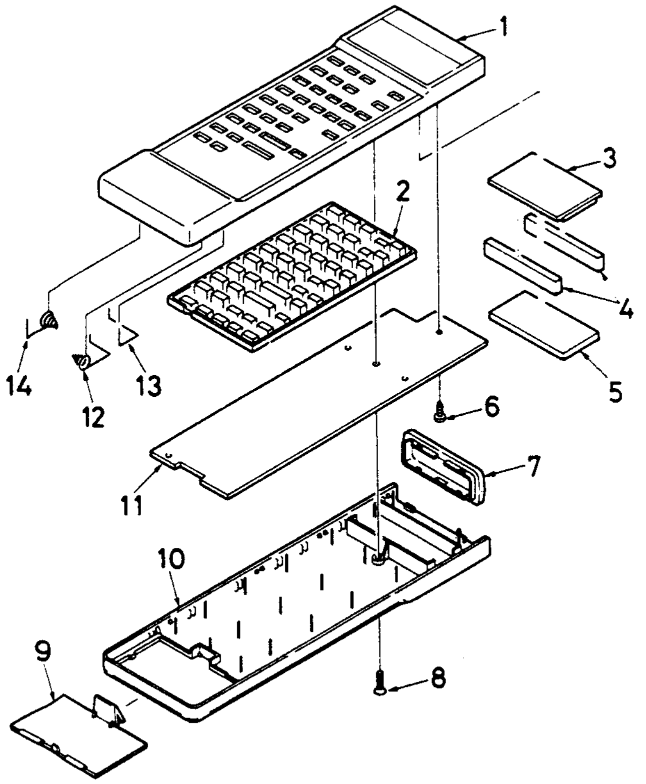
LOCATION	PARTS NO.	DESCRIPTION
S7114	613 006 3649	PUSH SWITCH.EJECT
OR	613 079 4130	SW.PUSH.EJECT
OR	613 092 0751	SW.PUSH.EJECT
OR	613 092 1734	SW.PUSH.EJECT
VR771	613 091 5450	VR.ROTARY 10KB
VR794	613 111 8010	VR.ROTARY 10K B

COMPL.TB-1

COMPL.NO. 613 111 8829

LOCATION	PARTS NO.	DESCRIPTION
C8502	403 071 6207	CERAMIC 220P K 50V
C8504	403 071 6207	CERAMIC 220P K 50V
C8506	403 071 6207	CERAMIC 220P K 50V
C8508	403 071 6207	CERAMIC 220P K 50V
C8522	403 071 6207	CERAMIC 220P K 50V
C8524	403 071 6207	CERAMIC 220P K 50V
C8526	403 071 6207	CERAMIC 220P K 50V
C8528	403 071 6207	CERAMIC 220P K 50V
CN853	613 077 0905	SOCKET.21P
OR	613 105 6633	SOCKET.21P
D8501	407 053 6704	ZENER DIODE MTZ5.6B-T-77
D8502	407 053 6704	ZENER DIODE MTZ5.6B-T-77
D8503	407 053 6704	ZENER DIODE MTZ5.6B-T-77
D8504	407 053 6704	ZENER DIODE MTZ5.6B-T-77
JK851	613 009 1529	SOCKET
JK852	613 085 8092	SOCKET
JK853	613 009 1529	SOCKET
JK854	613 085 8092	SOCKET
R8501	401 012 5609	CARBON 1K JA 1/4W
R8502	401 012 5609	CARBON 1K JA 1/4W
R8503	401 022 1806	CARBON 680 JA 1/4W
R8504	401 022 1806	CARBON 680 JA 1/4W
R8505	401 016 5704	CARBON 220K JA 1/4W
R8521	401 012 5609	CARBON 1K JA 1/4W
R8522	401 012 5609	CARBON 1K JA 1/4W
R8523	401 022 1806	CARBON 680 JA 1/4W
R8524	401 022 1806	CARBON 680 JA 1/4W
R8525	401 016 5704	CARBON 220K JA 1/4W
R8541	401 022 6702	CARBON 75 JA 1/4W
VR361	613 097 0572	VR.ROTARY 100KB
OR	613 117 3354	VR.ROTARY 100KB

LOCATION	PARTS NO.	DESCRIPTION
REMOCON		
COMPL.NO.	613 112 7111	
1	613 113 2177	ASSY.CABINET.TOP
2	613 113 1743	BUTTON
3	613 087 0087	LCD
4	613 080 9520	CONNECTOR
5	613 080 9728	SPACER
6	411 022 7807	SCR S-TPG PAN 2X6
7	613 080 9681	SIGN WINDOW
8	411 101 7308	SCR S-TPG FLT 2.6X10
9	613 040 1724	BATTERY LID
10	613 040 0727	BOTTOM LID
11	613 118 7856	COMPL.RM-1
12	613 080 9759	TERMINAL,-(INCLUDE RM-1)
13	613 080 9742	TERMINAL,+(INCLUDE RM-1)
14	613 080 9735	TERMINAL



LOCATION	PARTS NO.	DESCRIPTION
COMPL,RM-1		
COMPL.NO.	613 118 7856	
C1	403 068 0409	CERAMIC 0.1U Z 25V
C2	403 152 8502	ELECT 1U M 50V
C3	613 087 2043	CAP.TRIM 20P
C4	403 068 0409	CERAMIC 0.1U Z 25V
C5	403 068 0409	CERAMIC 0.1U Z 25V
C6	403 068 0409	CERAMIC 0.1U Z 25V
C7	403 153 0901	ELECT 100U M 6.3V
IC1	409 218 2309	IC LC5863H-1120
IC2	409 129 3402	IC UPD74HC08G
OR	409 208 1909	IC MLC74HC08AM
OR	409 221 3102	IC MC74HC08AF
LED1	407 040 3709	LED SLR-932A
Q1	405 021 2406	TR 2SD1048-X7-TB
OR	405 021 2505	TR 2SD1048-X8-TB
R1	401 037 5202	MT-GLAZE 100 JA 1/10W
R2	401 015 6405	CARBON 2.2 JA 1/4W
R3	401 037 5202	MT-GLAZE 100 JA 1/10W
R5	401 039 0601	MT-GLAZE 820K JA 1/10W
X1	613 082 8156	OSC.CRYSTAL 38.2293KHZ

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SERVICE MANUAL

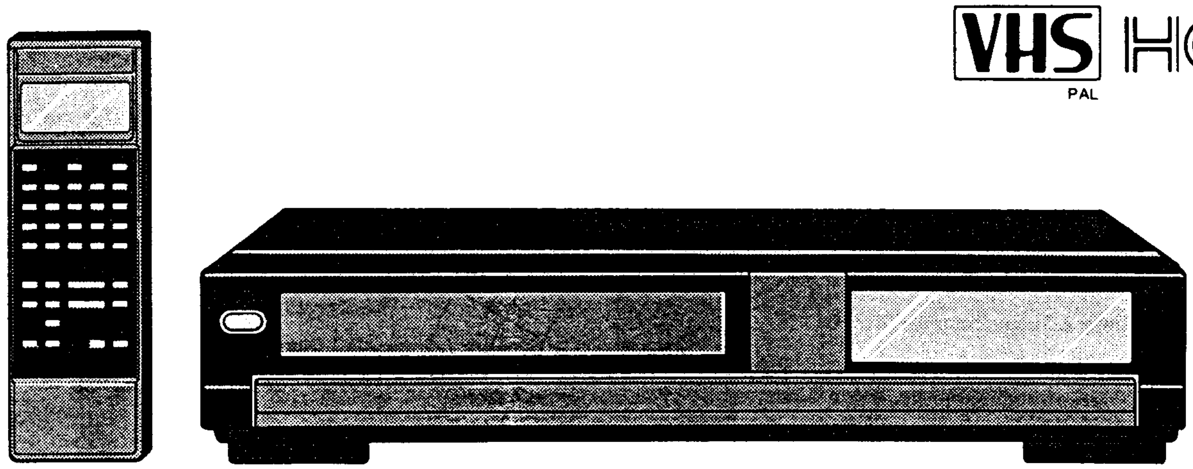
FISHER

FVH-P450 series

VIDEO
CASSETTE RECORDER

Hi-Fi VPS

VHS HQ
PAL



FVH-P450HV

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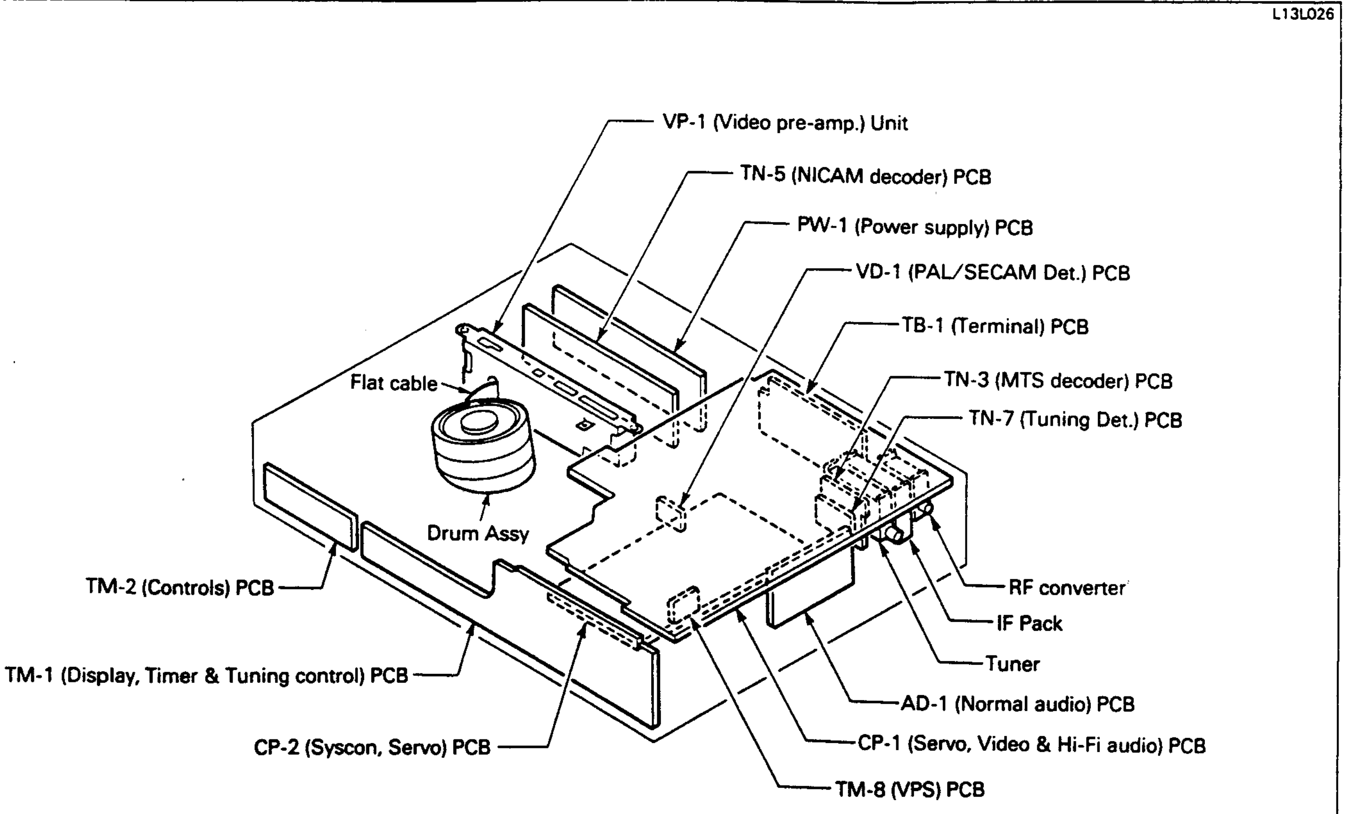
LP2H/G-F, EXF, SPF

REFERENCE No.WM-530734

1. CIRCUIT BOARD LOCATIONS

1-1. MAIN BOARDS


L13L026
VP-1 (Video pre-amp.) Unit
TN-5 (NICAM decoder) PCB
PW-1 (Power supply) PCB
VD-1 (PAL/SECAM Det.) PCB
TB-1 (Terminal) PCB
TN-3 (MTS decoder) PCB
TN-7 (Tuning Det.) PCB
Flat cable
Drum Assy
TM-2 (Controls) PCB
TM-1 (Display, Timer & Tuning control) PCB
CP-2 (Syscon, Servo) PCB
RF converter
IF Pack
Tuner
AD-1 (Normal audio) PCB
CP-1 (Servo, Video & Hi-Fi audio) PCB
TM-8 (VPS) PCB

NOTE:
* TN-3 (MTS decoder) and TM-8 (VPS) PCB is installed on FVH-P450HV only.
* TN-5 (NICAM decoder) PCB is installed on FVH-P450S.

Fig. 1-1

1-2. LOCATION FOR TAPE PATH ADJUSTMENT

NOTE: Test point TP182 and TP183 for tape path adjustment is shown in figure below.
For adjustment, refer to the separate volume "Mechanism Service Technical Information".

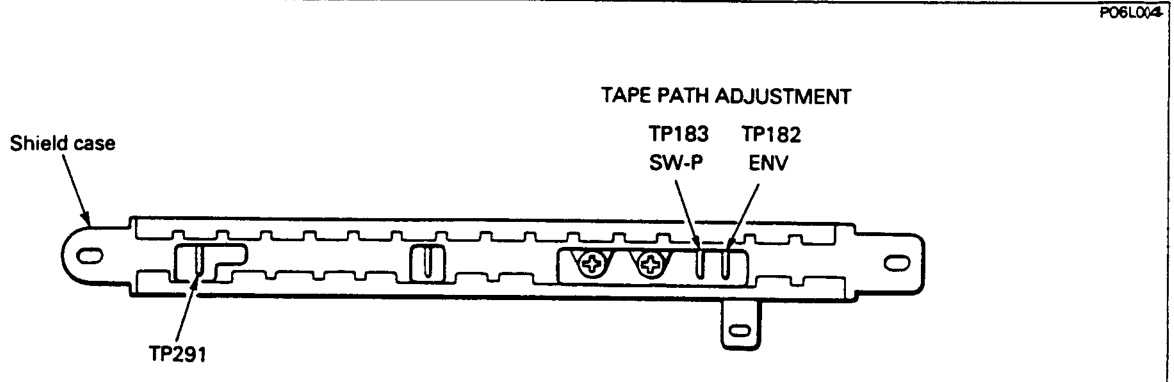

P06L004
TAPE PATH ADJUSTMENT
Shield case
TP183
SW-P
TP182
ENV
TP291

Fig. 1-2 Pre-amp Unit

2. ELECTRICAL ADJUSTMENT

2-1. PREPARATION

2-1-1. EQUIPMENT

- Colour TV monitor
- PAL Colour-bar generator (with RF and LINE OUTPUT)
- Audio signal generator
- Oscilloscope (dual trace; frequency response: 10MHz or more; probe: 10:1)
- Frequency counter (countable to 10MHz or higher)
- Digital voltmeter
- AC voltmeter
- In/output probes
- Alignment cassette (VHJ-0008) PAL Colour bar 1KHz
- Alignment cassette (VHJ-0009) Monoscope 6KHz
- Alignment cassette (VHJ-0051) Check for D.O.C.
- Alignment cassette (VHJ-0023) PAL Monoscope 6KHz, PAL Colour-bar 1KHz, SECAM Colour-bar 1KHz, PAL RF Sweep MESECAM Colour-bar 1KHz, NTSC Colour-bar 1KHz.
- Alignment cassette (VHJ-0080) PAL colour bar HiFi BPF
- Alignment cassette (VHJ-0020) AF level colour bar 1 KHz
- Relay jig (VHJ-0066) 7-wire cable for Pre-amp unit
  Connect the Flat cable end from the Drum assembly to the Pre-amp unit using the Relay jig to provide simple repairing and adjustment of the Pre-amp unit, as shown in Fig. 2-1-1. Further, when adjusting the Pre-amp unit, be sure to make contact an end of Shield case with Bracket of the Pre-amp unit to maintain the shield effect.
- Extension relay jig (VHJ-0079) for CP-1 PCB
  Connect between the CP-1 and TM-1 PCB using the Extension relay jig to provide simple repairing and adjustment of the CP-1 PCB, as shown in Fig. 2-1-2. Correctly, connect the Connector from CN304 on the CP-2 PCB to CN005 of the Relay jig, and that from CN001 of the Relay jig to CN711 of the TM-1 PCB. The connector from CN002 of the Relay jig is not required connect.

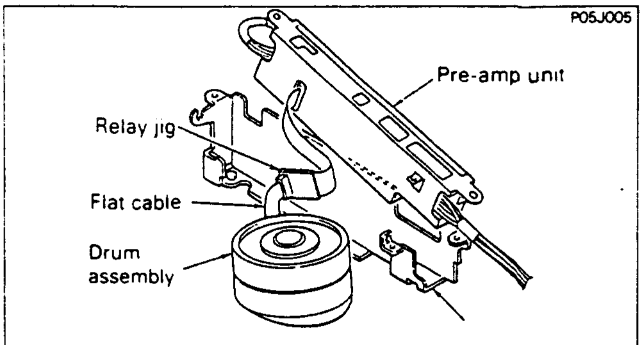

P05J005
Pre-amp unit
Relay jig
Flat cable
Drum assembly

Fig. 2-1-1

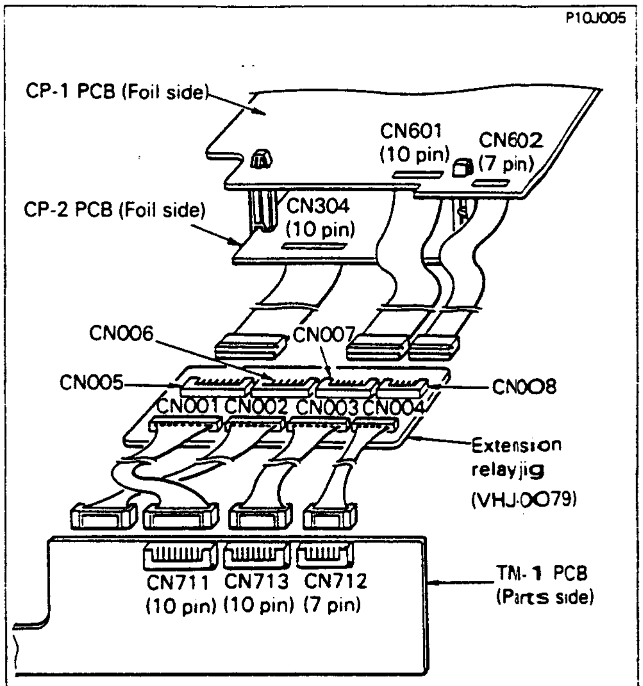

P10J005
CP-1 PCB (Foil side)
CN601 (10 pin)
CN602 (7 pin)
CP-2 PCB (Foil side)
CN304 (10 pin)
CN006
CN007
CN005
CN008
CN001 CN002 CN003 CN004
Extension relay jig (VHJ-0079)
CN711 CN713 CN712
(10 pin) (10 pin) (7 pin)
TM-1 PCB (Parts side)

Fig. 2-1-2

2-1-2. SET-UP

Because the RF input signal is used for circuit adjustments, connect the colour-bar generator to the ANT IN terminal of the VCR. The RF input signal is processed by the tuner and IF circuit. It is important that the video output signal of the IF circuit satisfies the items shown in Fig. 2-1-3. Connect the oscilloscope to the VIDEO OUTPUT terminal of the video circuit and terminate with a 75Ω load, and then check the video output signal.

- The amplitude of the sync signal should be approximately 0.3 Vp-p.
- The amplitude of the video signal should be approximately 0.7 Vp-p.
- While observing the oscilloscope or TV screen, make fine-tuning adjustments so that the colour burst amplitude is approximately 0.3 Vp-p.
- Check to be sure that there is no spike noise in the sync part of the horizontal sync signal.

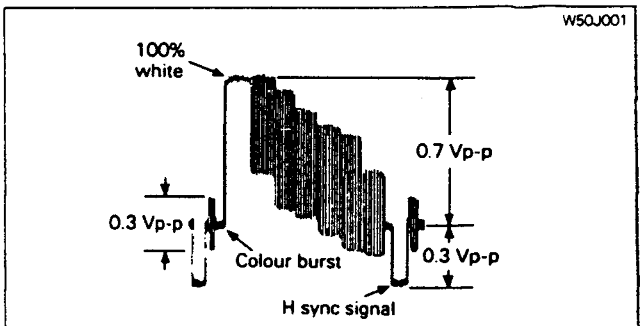
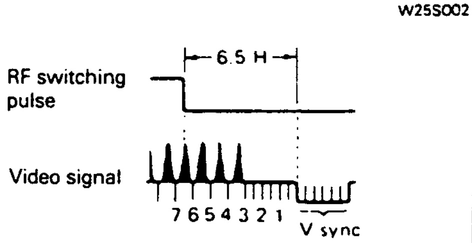

W50J001
100% white
0.7 Vp-p
0.3 Vp-p
Colour burst
0.3 Vp-p
H sync signal

Fig. 2-1-3

2-2. SERVO CIRCUIT ADJUSTMENT ..... CP-1 PCB

NOTE (1) : These adjustments should be carried out upon completion of the transport adjustments.
(2) : If the tape transport adjustments are carried out after these adjustments, follow the procedures again in SWITCHING POSITIONS.

No.	Item	Input	Mode	Point	Location	Remark
1	SWITCHING POSITION	Alignment cassette (VHJ-0009 or VHJ-0023)	PLAY	VIDEO OUTPUT TP101 RF SW pulse TP183 (Pre-amp unit)	VR351	 W25S002 6.5 H RF switching pulse Video signal 7 6 5 4 3 2 1 V sync 1. Press the tracking control (+) (–) buttons simultaneously to the center position (on the display "T —:— "). 2. Adjust VR351 so that the phase of the leading edge of the vertical sync signal is delayed 6.5 ± 0.5 H from the fall of the RF switching pulse waveform.
2	STILL V-LOCK	Colour bar from Colour bar generator	REC ↓ PLAY ↓ STILL	TV screen	VR361 Rear panel	1. Put the VCR in the REC mode and record at the middle of the cassette tape. 2. Playback the recorded part, and put the VCR in the STILL mode. 3. Adjust VR361 so that the V jitter (very fine movement of the vertical sync) is minimized.

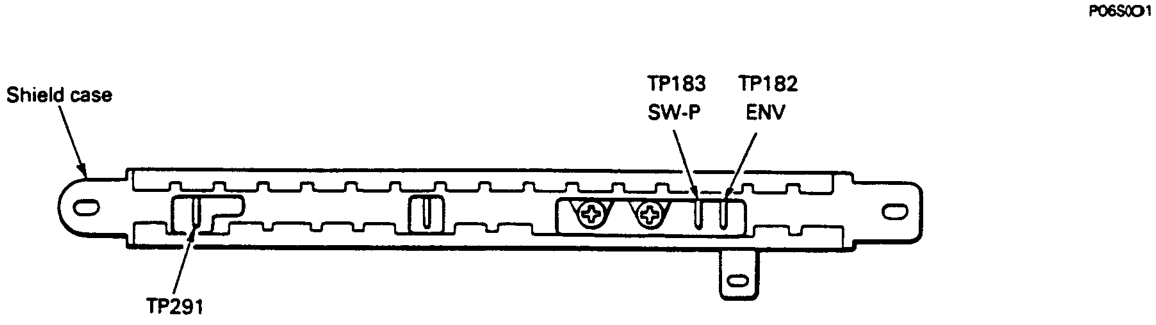


Fig. 2-2-1 Pre-amp Unit

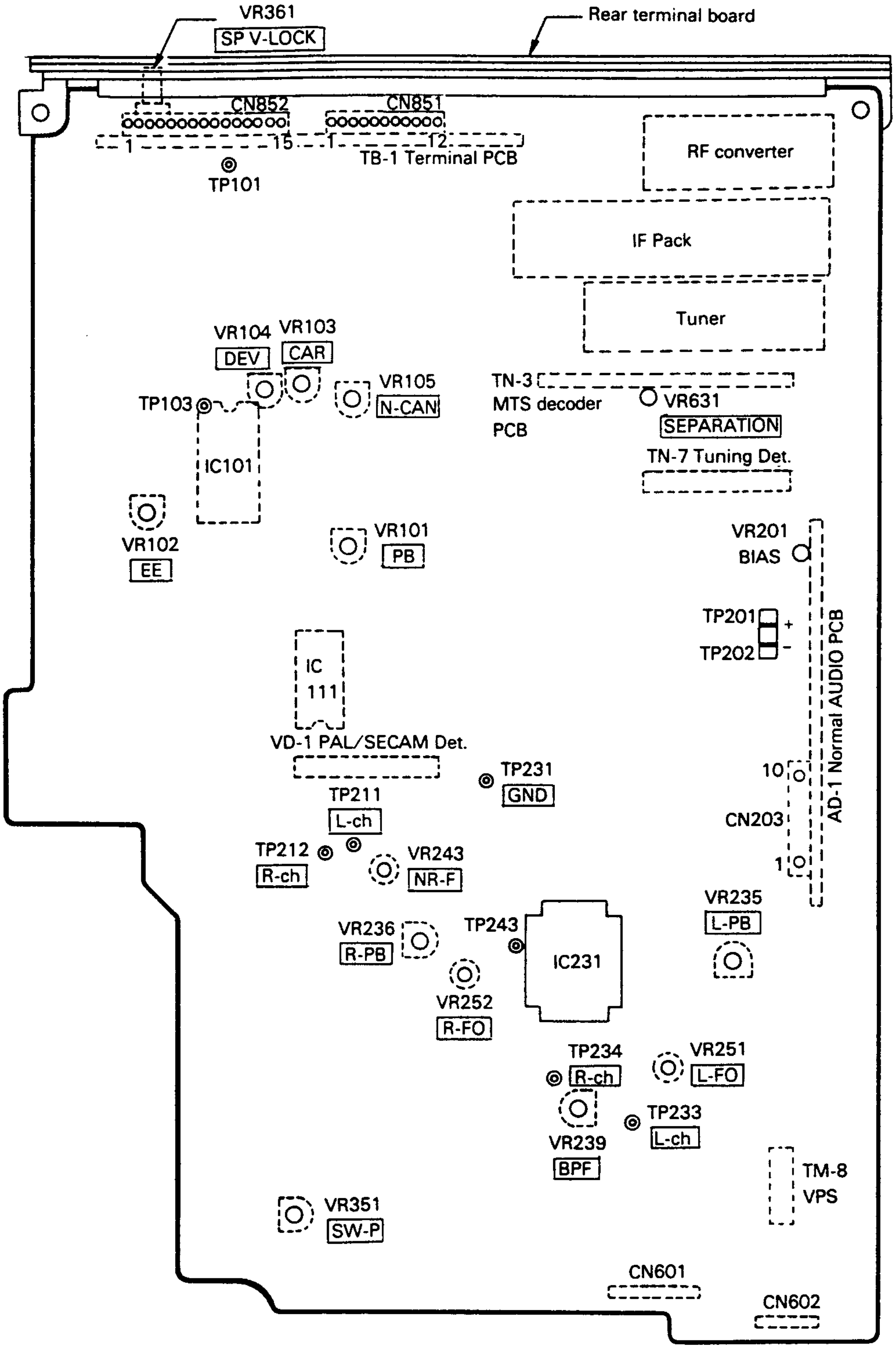
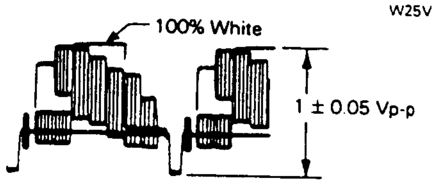
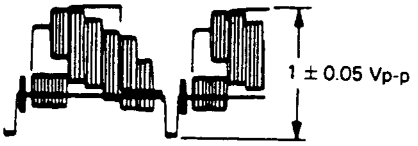
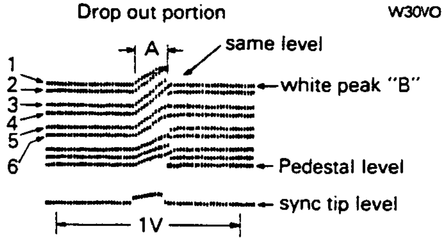
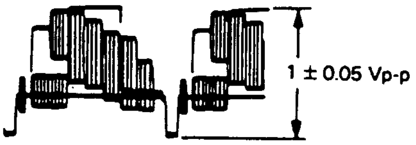
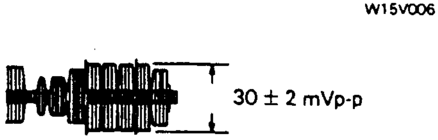
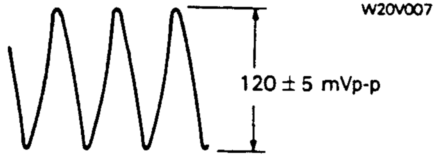

P22S021
VR361
SP V-LOCK
Rear terminal board
CN852
CN851
1
15
1
12
TB-1 Terminal PCB
TP101
RF converter
IF Pack
Tuner
VR104
VR103
DEV
CAR
VR105
N-CAN
TP103
IC101
TN-3
MTS decoder
PCB
VR631
SEPARATION
TN-7 Tuning Det.
VR102
EE
VR101
PB
VR201
BIAS
TP201
+
TP202
-
AD-1 Normal AUDIO PCB
IC
111
VD-1 PAL/SECAM Det.
TP231
GND
TP211
L-ch
10
CN203
1
TP212
R-ch
VR243
NR-F
VR235
L-PB
VR236
R-PB
TP243
IC231
VR252
R-FO
TP234
R-ch
VR251
L-FO
VR239
BPF
TP233
L-ch
TM-8
VPS
VR351
SW-P
CN601
CN602

Fig. 2-2-2 CP-1 PCB (Foil side view)

2-3. VIDEO CIRCUIT ADJUSTMENT ... CP-1 PCB and VP-1 Pre-amp Unit

NOTE (1) : When adjustment No. 1, No. 2 and No. 5 below, terminate VIDEO OUTPUT TP101 at 75 ohms.
(2) : Adjustment No. 3 below, should be performed after stabilizing the circuit operation. (At least 5 minutes after VCR power on.)
(3) : 'No-signal REC mode' is not to supply any signal to VIDEO INPUT terminal.
(4) : Use the Relay jig mentiond in the 2-1. PREPARATION to provide easy adjustment of the Pre-amp unit.

No.	Item	Input	Mode	Point	Location	Remark
1	E-E LEVEL	Colour bar (100% white level) from Colour bar generator	E-E	VIDEO OUTPUT TP101 (CP-1 PCB)	VR102	W25V001  1. Adjust VR102 so that the level is 1.00 ± 0.05 Vp-p.
2	PB-Y LEVEL	Alignment cassette (VHJ-0008 or VHJ-0023)	PLAY	VIDEO OUTPUT TP101 (CP-1 PCB)	VR101	W20V003  1. Adjust VR101 so that the level is 1.00 ± 0.05 Vp-p.
3	N-CAN LEVEL	Alignment cassette (VHJ-0051)	PLAY	VIDEO OUTPUT TP101 (CP-1 PCB)	VR105	W30V013  Drop out portion A same level 1 2 3 4 5 6 white peak "B" Pedestal level sync tip level 1V 1. Set the horizontal scale (TIME/DIV) of the oscilloscope to 1 ~ 2 msec./div. and observe the drop out waveform. 2. Turn the horizontal scale to 0.2 msec./div.. 3. Adjust VR105 so that the drop out portion "A" of 4th waveform and other white peak "B" are same level.
4	CARRIER SET	No-signal	REC	TP103 (CP-1 PCB)	VR103	1. Set the channel selector buttons to the AV position and put the VCR in the no-signal REC mode. 2. Adjust VR103 so that the frequency is 3.80 ± 0.05 MHz.
5	DEVIATION	Colour bar (100% white level) from Colour bar generator	REC (Adjustment) ↓ PLAY (Check)	VIDEO OUTPUT TP101 (CP-1 PCB)	VR104	W20V003  1. Insert the blank tape to the VCR and record colour bar signal. 2. Playback the recorded part, and check that the level is 1.00 ± 0.05 Vp-p. 3. Repeat adjust VR104 before the record, and the playback it, if not satisfactory.

No.	Item	Input	Mode	Point	Location	Remark
6	C REC CURRENT	Colour bar from Colour bar generator	REC	TP181 (HOT) shield case (GND) (Pre-amp unit)	VR181	 1. Rotate VR182 so that the luminance level is minimize. 2. Adjust VR181 so that the level is 30 ± 2 mVp-p.
7	Y REC CURRENT	No-signal	REC	TP181 (HOT) shield case (GND) (Pre-amp unit)	VR182	 1. Set the channel selector buttons to AV position and put the VCR in the no-signal REC mode. 2. Adjust VR182 so that the level is 120 ± 5 mVp-p.

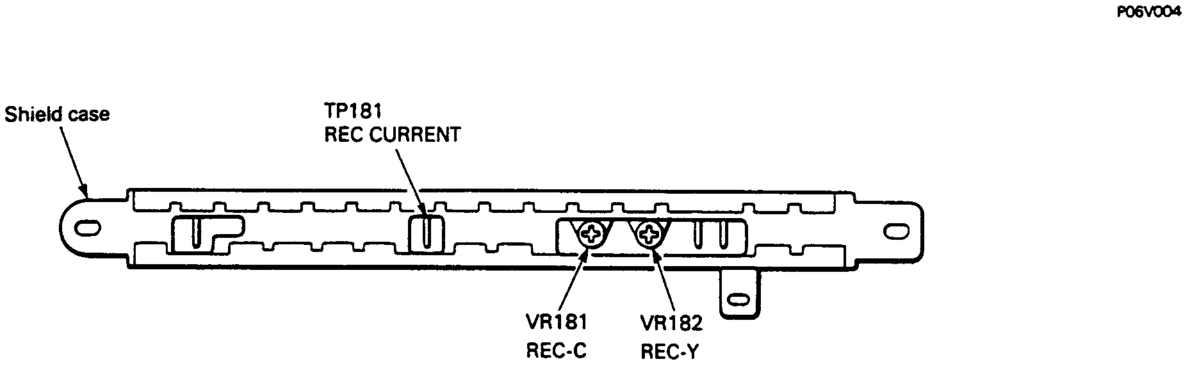

P06V004
Shield case
TP181
REC CURRENT
VR181
REC-C
VR182
REC-Y

Fig. 2-3-1 Pre-amp Unit

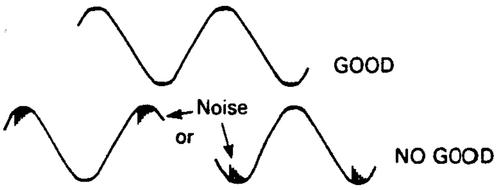
2-4. AUDIO CIRCUIT ADJUSTMENT

SETTING BEFORE ADJUSTMENT

- The audio input terminal (EURO-AV) of the audio frequency oscillator should be terminated at 600 ohms.
- The audio output terminal (EURO-AV) of the VCR should be terminated at 47 killo ohms (L ch and R ch).
- 0/AV button on the remote control unit .... [AV] position.
- AUDIO output button on the remote control unit .... [L] and [R] position.
- SP/LP select button on the remote control unit .... [SP] position.

Hi-Fi AUDIO CIRCUIT .... CP-1 PCB

NOTE (1): The Hi-Fi AUDIO section adjustment has separate adjustment items for the L ch and R ch. The R ch adjustments are included in parentheses.
(2): 'No-signal record mode' is not to supply any signal to the AUDIO INPUT terminal.

No.	Item	Input	Mode	Point	Location	Remark
1	A-FM CARRIER FREQUENCY	No-signal	REC	TP233 (L ch) TP234 (R ch)	VR251 (L ch) VR252 (R ch)	1. Connect a frequency counter to TP233 (TP234) and ground. 2. Adjust VR251 (VR252) so that the carrier frequency is 1.4 MHz (1.8 MHz) ± 2.5 KHz.
2	A-FM BPF	Alignment cassette (VHJ-0080)	PLAY	AUDIO OUTPUT CN852 pin 10 (L ch) pin 9 (R ch)	VR239	 1. Connect a oscilloscope to CN852 pin 10 (pin 9) and ground. 2. Playback the alignment cassette and observe the waveform on the audio output. 3. Adjust VR239 until the noise component of both channel is minimum level.
3	A-FM NR FILTER	Audio signal (5 KHz, -17 dBm) from Audio signal generator	E-E	TP243	VR243	1. Adjust VR243 so that the output level is minimum.
4	A-FM PB LEVEL	Alignment cassette (VHJ-0020)	PLAY	AUDIO OUTPUT CN852 pin 10 (L ch) pin 9 (R ch)	VR235 (L ch) VR236 (R ch)	1. Adjust VR235 (VR236) so that the playback level is -7 ± 0.5dBm.

NORMAL AUDIO CIRCUIT ..... CP-1 and AD-1 PCB

NOTE (1): The VR201 (on the AD-1 PCB) accessible from the foil side of CP-1 PCB (Fig. 2-2-2).
(2): 'No-signal record mode' is not to supply any signal to the AUDIO INPUT terminal.
(3): Press the AUDIO output select button to the Mono (No indication) position.

No.	Item	Input	Mode	Point	Location	Remark
1	BIAS	No-signal	REC	TP201 (HOT) TP202 (CP-1 PCB)	VR201 (CP-1 PCB)	1. Set the channel selector buttons to the AV position and put the VCR in the no-signal REC mode. 2. Adjust VR201 so that the level is 19 mVrms.

2-5. MTS (Multiplex TV System) DECODER CIRCUIT ADJUSTMENT ... TN-3 PCB

NOTE: The VR631 is accessible from the foil side of CP-1 PCB (Fig. 2-2-1).

No.	Item	Input	Mode	Point	Location	Remark
1	STEREO SEPARATION	Audio signal (R ch...1 KHz 100% mod. L ch...400Hz unmod.) from Audio MPX TV signal generator	E-E	AUDIO OUTPUT CN852 pin 10 (L ch) (CP-1 PCB)	VR631	1. Set the pilot signal for the stereo mode. With the L ch unmodulated, provide 1 KHz 100% modulation on the R ch. 2. Connect an oscilloscope to the audio output terminal (L ch) and adjust VR631 for minimum waveform peak-to-peak value.
2	STEREO (117.5 Hz)	TV broadcast (Stereo)	E-E	IC631 pin 5	VR632	1. Select the TV channel to stereo programme. 2. Adjust VR632 so that the waveform is maximize.
3	BILINGUL (274.1 Hz)	TV broadcast (Bilingul)	E-E	IC631 pin 6	VR633	1. Select the TV channel to bilingul programme. 2. Adjust VR633 so that the waveform is maximize.

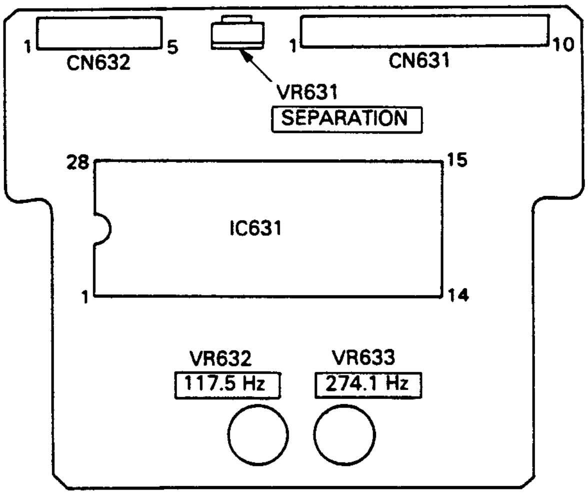
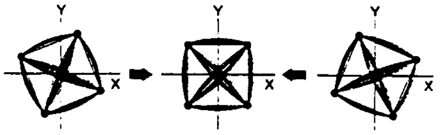


Fig. 2-5-1 TN-3 PCB (Parts side view)

2-6. NICAM DECODER CIRCUIT ADJUSTMENT ... TN-5 PCB

NOTE (1): Do not use a metalic screw driver.
(2): Use the same type of probe (10 MHz, 15 pF) for CH-1 and CH-2.

No.	Item	Input	Mode	Point	Location	Remark
1	CARRIER (VCXO)	NICAM system broadcasting	E-E	TP671 (CH-1) TP672 (CH-2) (TN-5 PCB)	CT671 (TN-5 PCB)	P08N001  1. Receive a NICAM-system (approx. 70 dBμ) broadcasting. 2. Set the oscilloscope to X—Y mode. Set VOLTAGE/DIV. of CH-1 (X) and CH-2 (Y) to 20 mV/DIV.. 3. Connect CH-1 (X) and CH-2 (Y) of the oscilloscope to the TP671; CH-1 and TP672; CH-2. 4. Adjust CT671 so that the resurge waveform becomes parallel to the X and Y axes.

P08N001

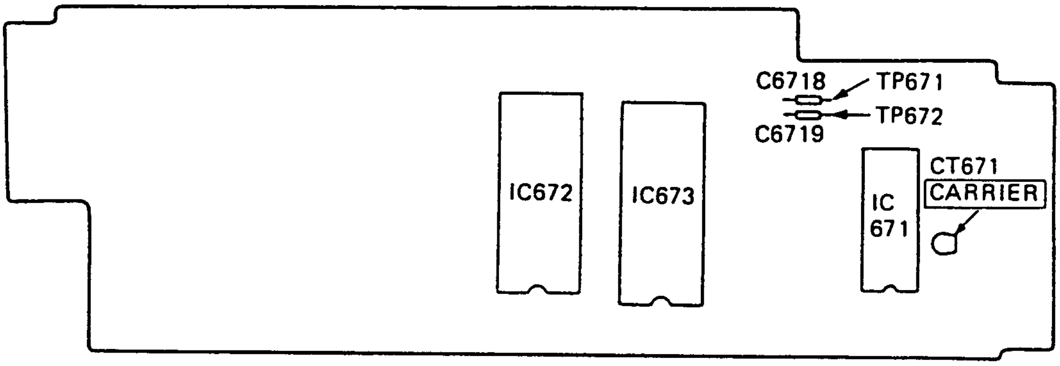


Fig. 2-6-1 TN-5 PCB (Parts side view)

2-7. TUNER IF CIRCUIT ADJUSTMENT ... VIF Pack

No.	Item	Input	Mode	Point	Location	Remark
1	RF AGC	TV broadcast	E-E	TV screen	VR611	1. Turn VR611 in the direction which causes snow to appear, then in the opposite direction until the snow just disappears.

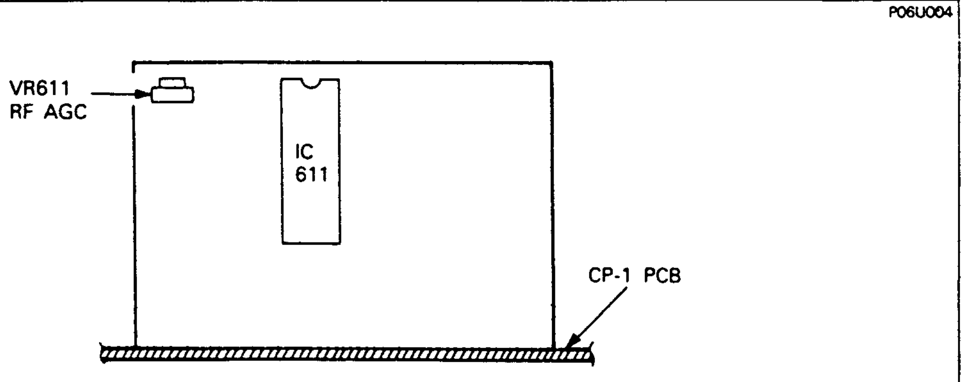

P06U004
VR611
RF AGC
IC
611
CP-1 PCB

Fig. 2-7-1 IF Pack PCB (Parts side view)

ZF0001(N)

FISHER

SANYO FISHER Vertriebs GmbH

Stahlgruberring 4
8000 München 82

Tel: 089/420 45-0
Tlx: 524033
Fax: 089/420 45-147
Btx: * 089-237000 #

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Aug./'90/1800 HA Printed in Japan

BLOCK DIAGRAMS, CIRCUIT DIAGRAMS & PRINTED CIRCUIT BOARD

FVH-P450S (Europe, Spain)

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IC301 (μPD75512GF) SYSTEM CONTROL MPU PIN FUNCTIONS TABLE 50
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IC711 (M50959) TIMER MPU PIN FUNCTIONS TABLE 52

IR REMOTE CONTROL CIRCUIT DIAGRAM 53

LP2H/EXF, SPF 07H

REFERENCE NO. WM-530736

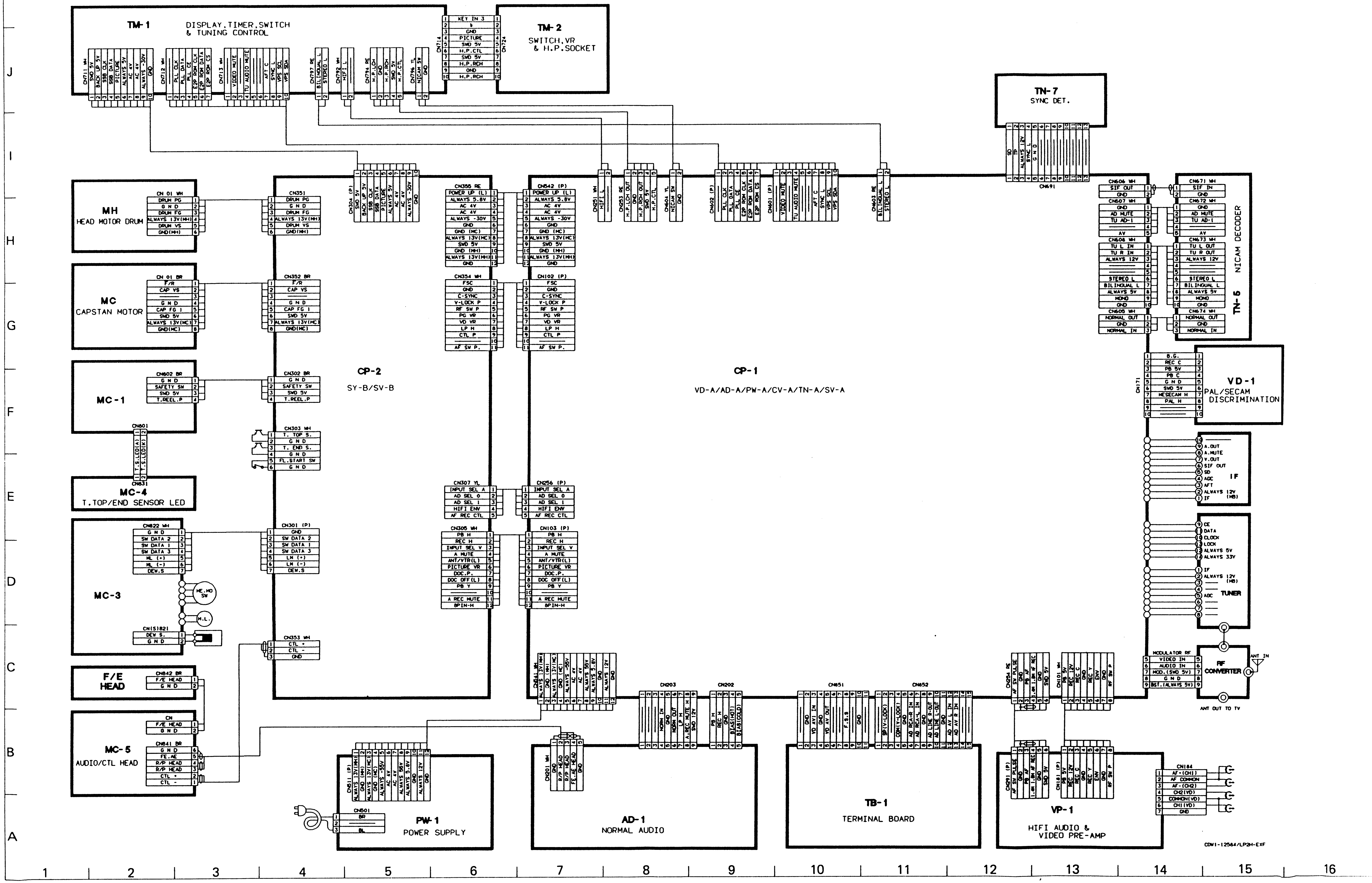
NOTES:

1. All resistance values in "OHMS" unless otherwise noted. (K = 1,000 M = 1,000,000)
2. All capacitance values in "μfd" unless otherwise noted.
   p = pico farad
3. All inductance values in "mH" unless otherwise noted. μ = micro henry

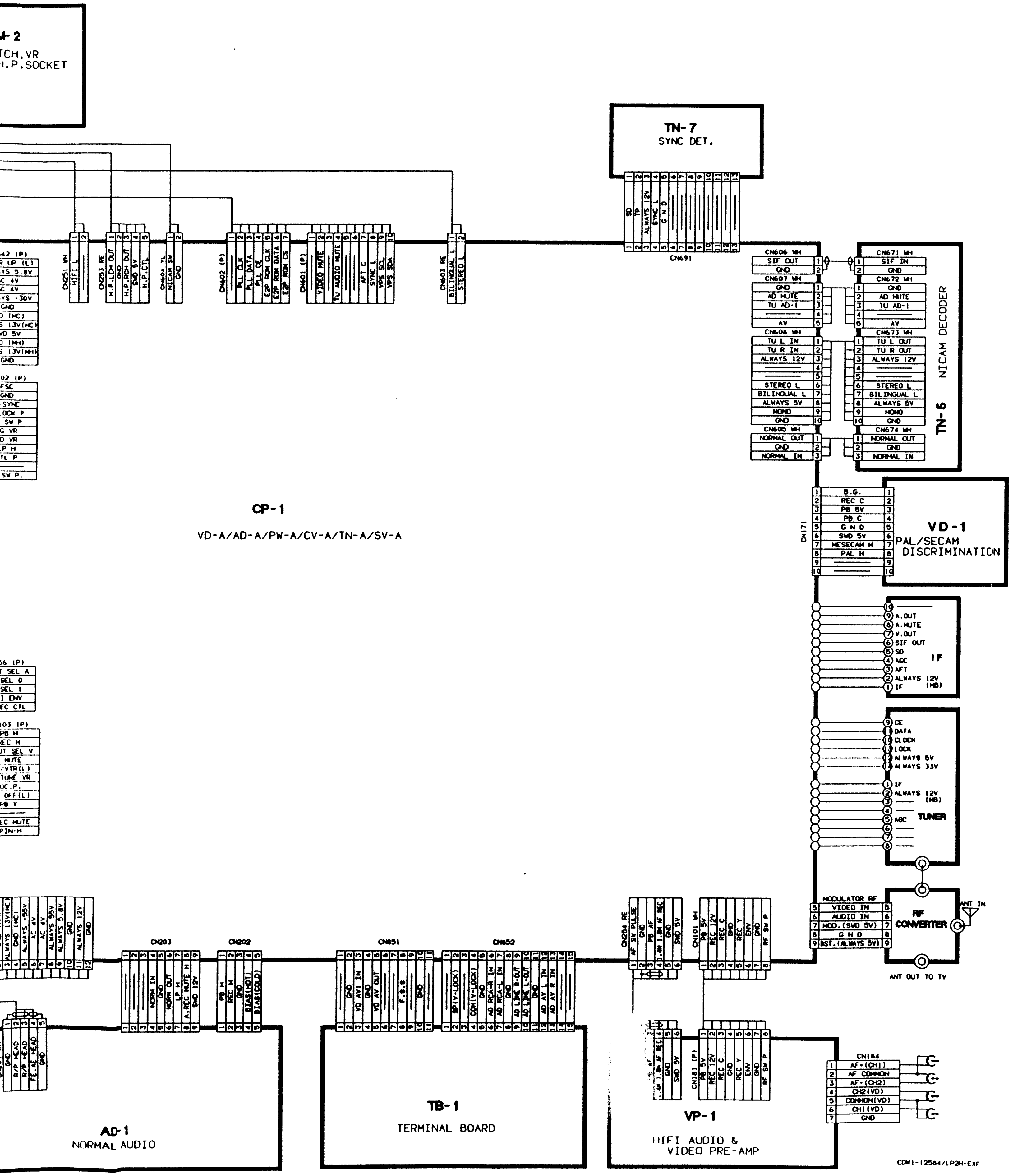
PRODUCT SAFETY NOTICE

THE COMPONENTS DESIGNATED BY A SYMBOL (⚠) IN THIS SCHEMATIC DIAGRAM DESIGNATES COMPONENTS WHOSE VALUE ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. SHOULD ANY COMPONENT DESIGNATED BY A SIMBOL NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST. DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

OVERALL WIRING DIAGRAM

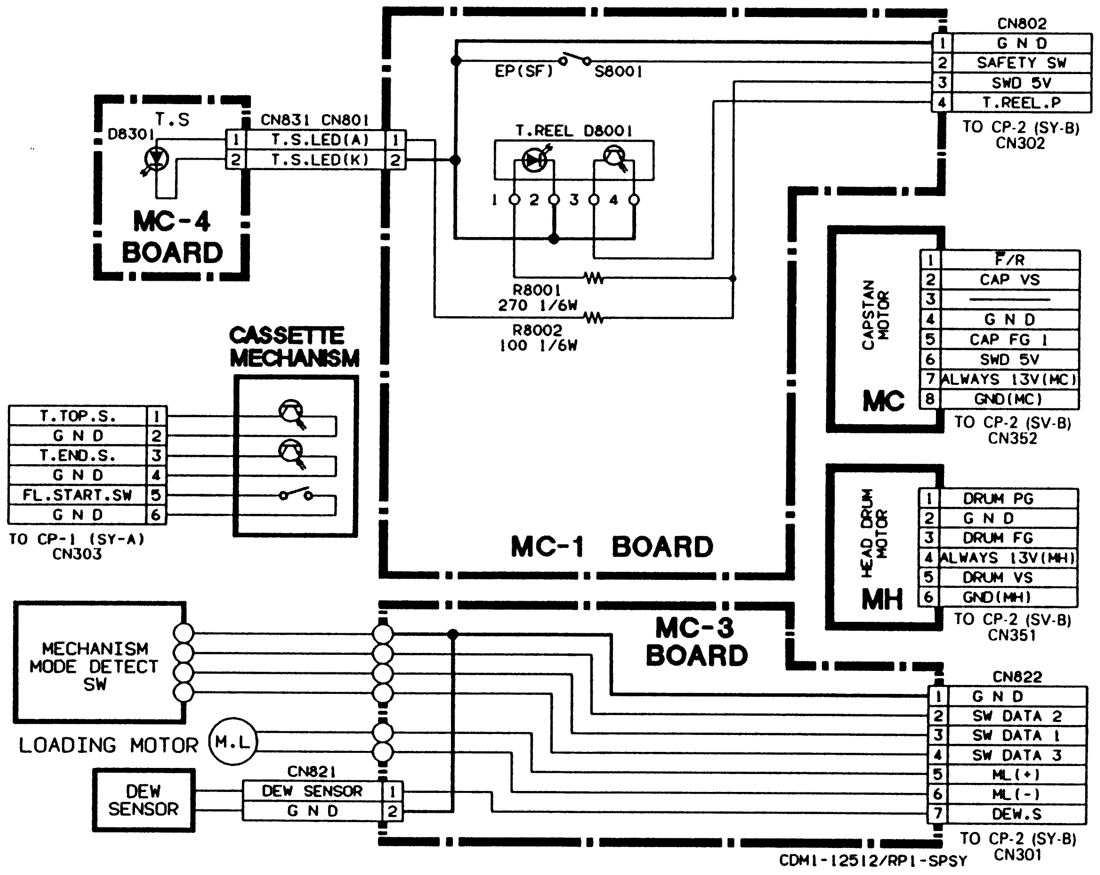

K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
TM-1
DISPLAY,TIMER,SWITCH & TUNING CONTROL
CN711 WH
SWD 5V
BACK UP 5V
SSB CLK
SSB DATA
PICTURE
ALWAYS 5V
AC 4V
AC 4V
ALWAYS -30V
GND
CN712 WH
PLL CLK
PLL DATA
PLL CE
E2P ROM DATA
E2P ROM CLK
CN713 WH
E2P ROM CS
VIDEO MUTE
TU AUDIO MUTE
AFT C
SYNC L
VPS SCL
VPS SDA
CN797 RE
BILINGUAL L
STEREO L
CN792 WH
HIFI L
CN794 RE
H.P.LCH
GND
H.P.RCH
SWD 5V
H.P.CTL
CN796 YL
NICAM 5V
GND
CN714
KEY IN 3
b
GND
PICTURE
SWD 5V
H.P.CTL
SWD 5V
H.P.RCH
GND
H.P.RCH
CN724
TM-2
SWITCH,VR & H.P.SOCKET
TN-7
SYNC DET.
SD
TP
ALWAYS 12V
SYNC L
GND
CN691
MH
HEAD MOTOR DRUM
CN 01 WH
DRUM PG
GND
DRUM FG
ALWAYS 13V(MH)
DRUM VS
GND(MH)
CN351
MC
CAPSTAN MOTOR
CN 01 BR
F/R
CAP VS
GND
CAP FG 1
SWD 5V
ALWAYS 13V(MC)
GND(MC)
CN352 BR
MC-1
CN602 BR
GND
SAFETY SW
SWD 5V
T.REEL.P
CN302 BR
CN601
T.S.LED(A)
T.S.LED(K)
CN631
MC-4
T.TOP/END SENSOR LED
CN303 WH
T. TOP S.
GND
T. END S.
GND
FL.START SW
GND
MC-3
CN622 WH
GND
SW DATA 2
SW DATA 1
SW DATA 3
ML (+)
ML (-)
DEW.S
CN301 (P)
ME.MO SW
M.L.
CN(S)621
DEW S.
GND
CN353 WH
CTL +
CTL -
GND
F/E HEAD
CN642 BR
F/E HEAD
GND
MC-5
AUDIO/CTL HEAD
CN
F/E HEAD
GND
CN641 BR
GND
FE.AE
R/P HEAD
R/P HEAD
CTL +
CTL -
CP-2
SY-B/SV-B
CN304 (P)
SWD 5V
BACK UP 5V
SSB CLK
SSB DATA
PICTURE
ALWAYS 5V
AC 4V
AC 4V
ALWAYS -30V
GND
CN355 RE
CN542 (P)
POWER UP (L)
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
GND
GND (MC)
ALWAYS 13V(MC)
SWD 5V
GND (MH)
ALWAYS 13V(MH)
GND
CN354 WH
CN102 (P)
FSC
GND
C-SYNC
V-LOCK P
RF SW P
PG VR
VD VR
LP H
CTL P
AF SW P.
CN307 YL
CN256 (P)
INPUT SEL A
AD SEL 0
AD SEL 1
HIFI ENV
AF REC CTL
CN305 WH
CN103 (P)
PB H
REC H
INPUT SEL V
A MUTE
ANT/VTR(L)
PICTURE VR
DOC.P.
DOC OFF(L)
PB Y
A REC MUTE
8PIN-H
CP-1
VD-A/AD-A/PW-A/CV-A/TN-A/SV-A
CN251 WH
HIFI L
CN253 RE
GND
H.P.LCH OUT
GND
H.P.RCH OUT
SWD 5V
H.P.CTL
CN604 YL
NICAM 5V
GND
CN602 (P)
PLL CLK
PLL DATA
PLL CE
E2P ROM CLK
E2P ROM DATA
E2P ROM CS
CN601 (P)
VIDEO MUTE
TU AUDIO MUTE
AFT C
SYNC L
VPS SCL
VPS SDA
CN603 RE
BILINGUAL L
STEREO L
CN606 WH
SIF OUT
GND
CN607 WH
GND
AD MUTE
TU AD-1
AV
CN608 WH
TU L IN
TU R IN
ALWAYS 12V
STEREO L
BILINGUAL L
ALWAYS 5V
MONO
GND
CN605 WH
NORMAL OUT
GND
NORMAL IN
CN671 WH
SIF IN
GND
CN672 WH
CN673 WH
TU L OUT
TU R OUT
CN674 WH
TN-5
NICAM DECODER
CN171
B.G.
REC C
PB 5V
PB C
GND
SWD 5V
MESECAM H
PAL H
VD-1
PAL/SECAM DISCRIMINATION
A.OUT
A.MUTE
V.OUT
SIF OUT
SD
ADC
AFT
ALWAYS 12V (MB)
IF
IF
CE
DATA
CLOCK
LOCK
ALWAYS 5V
ALWAYS 33V
TUNER
MODULATOR RF
VIDEO IN
AUDIO IN
MOD.(SWD 5V)
GND
BST.(ALWAYS 5V)
RF CONVERTER
ANT IN
ANT OUT TO TV
CN541 WH
CN511 (P)
ALWAYS 13V(MH)
GND (MH)
ALWAYS 13V(MC)
GND (MC)
ALWAYS -35V
AC 4V
AC 4V
ALWAYS 56V
ALWAYS 5.8V
ALWAYS 12V
GND
CN501
BR
BL
PW-1
POWER SUPPLY
CN203
CN202
CN201 WH
GND
R/P HEAD
GND
FE.AE HEAD
GND
NORM IN
NORM OUT
SWD 12V
LP H
A.REC MUTE H
PB H
REC H
BIAS(HOT)
BIAS(COLD)
AD-1
NORMAL AUDIO
CN651
CN652
VD AV1 IN
VD AV OUT
F.S.S
SP(V-LOCK)
COM1V(-LOCK)
AD RCA-R IN
AD RCA-L IN
AD LINE R-OUT
AD LINE L-OUT
AD AV L IN
AD AV R IN
TB-1
TERMINAL BOARD
CN254 RE
CN291 (P)
AF SW PULSE
GND
PB AF
1.8H 1 BH NF REC
GND
SWD 5V
CN101 WH
CN181 (P)
PB 5V
REC 12V
REC C
REC Y
ENV
GND
RF SW P
VP-1
HIFI AUDIO & VIDEO PRE-AMP
CN184
AF+(CH1)
AF COMMON
AF-(CH2)
CH2(VD)
COMMON(VD)
CH1(VD)
GND
CDW1-12584/LP2H-EXF

OVERALL WIRING DIAGRAM



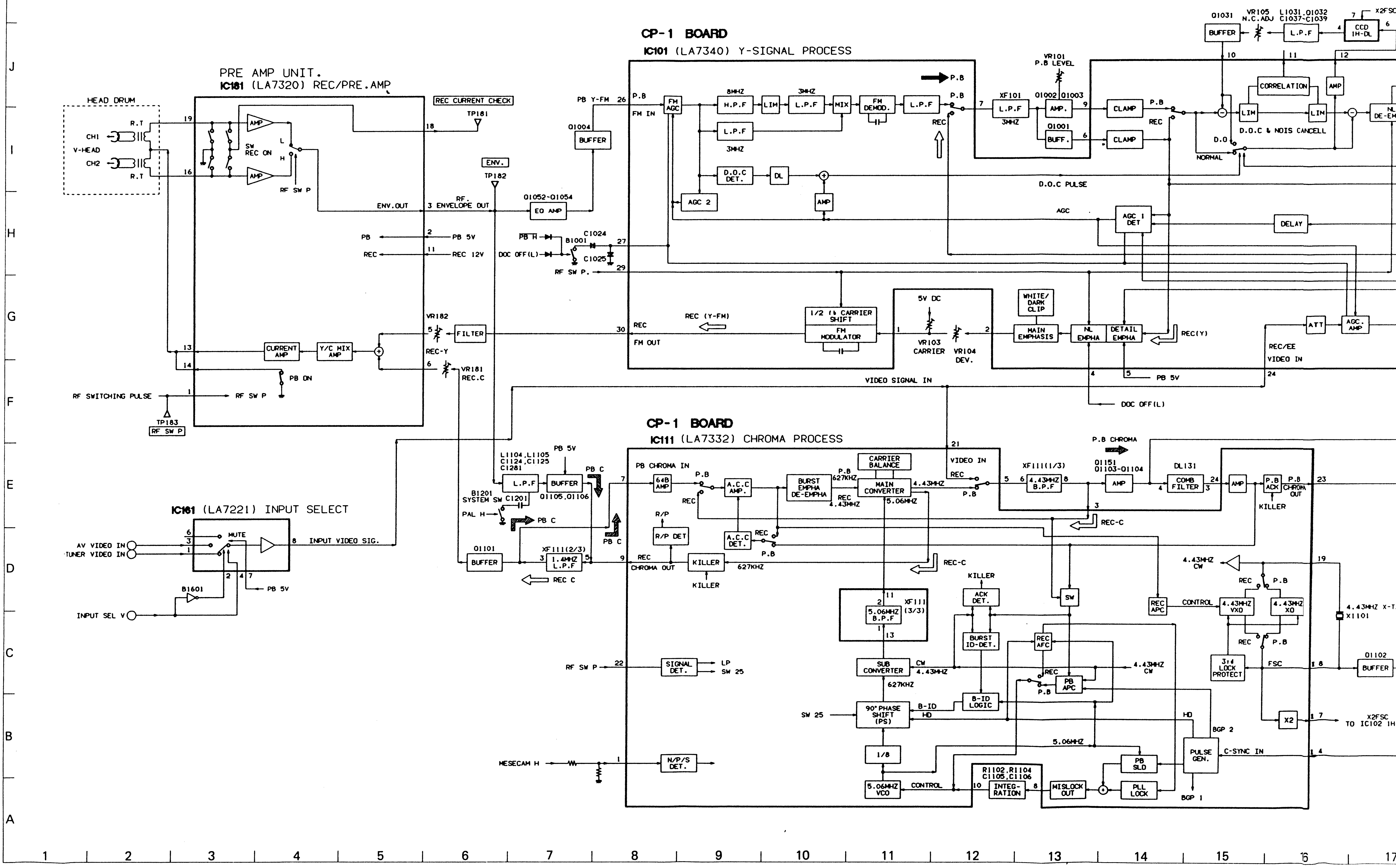
TCH,VR
H.P.SOCKET
TN-7
SYNC DET.
CN691
CN606 WH
SIF OUT
CN607 WH
AD MUTE
TU AD-1
CN608 WH
TU L IN
TU R IN
ALWAYS 12V
STEREO L
BILINGUAL L
ALWAYS 5V
MONO
GND
CN605 WH
NORMAL OUT
NORMAL IN
CN671 WH
SIF IN
CN672 WH
CN673 WH
TU L OUT
TU R OUT
CN674 WH
TN-5
NICAM DECODER
CN171
B.G.
REC C
PB 6V
PB C
SWD 5V
MESECAM H
PAL H
VD-1
PAL/SECAM DISCRIMINATION
A.OUT
A.MUTE
V.OUT
SIF OUT
SD
AGC
AFT
ALWAYS 12V (HB)
IF
CE
DATA
CLOCK
LOCK
ALWAYS 6V
ALWAYS 33V
TUNER
MODULATOR RF
VIDEO IN
AUDIO IN
MOD.(SWD 5V)
BST.(ALWAYS 5V)
RF CONVERTER
ANT IN
ANT OUT TO TV
CP-1
VD-A/AD-A/PW-A/CV-A/TN-A/SV-A
CN251 WH
CN253 RE
CN604 YL
CN602 (P)
CN601 (P)
CN603 RE
CN203
CN202
CN851
CN852
CN284 RE
CN101 WH
CN181 (P)
CN184
AF-(CH1)
AF COMMON
AF-(CH2)
CH2(VD)
COMMON(VD)
CH1(VD)
AD-1
NORMAL AUDIO
TB-1
TERMINAL BOARD
VP-1
HIFI AUDIO & VIDEO PRE-AMP
CDW1-12584/LP2H-EXF

MECHANISM CONNECTION CIRCUIT DIAGRAM

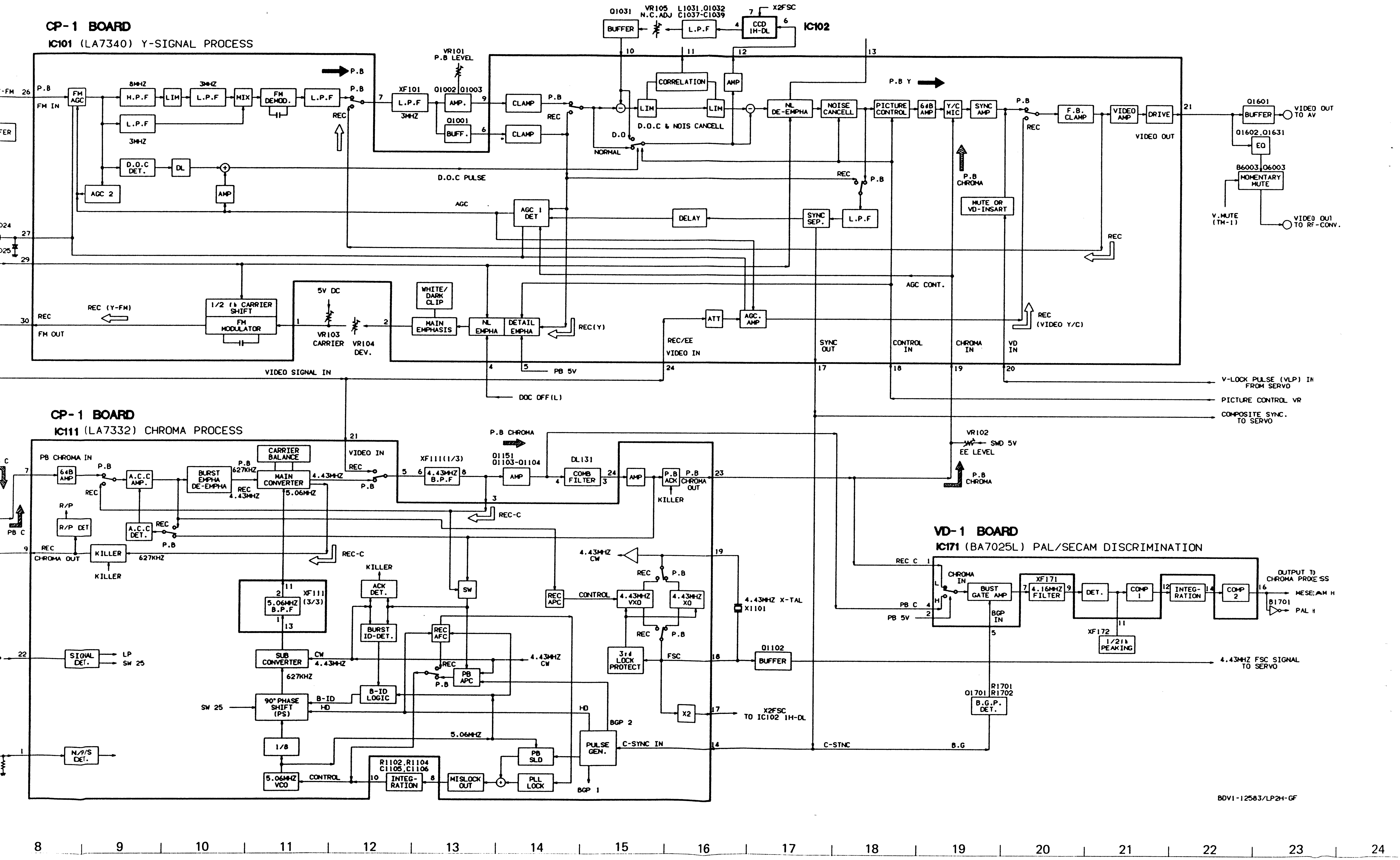


T.S
D8301
MC-4 BOARD
CN831 CN801
T.S.LED(A)
T.S.LED(K)
EP(SF)
S8001
T.REEL D8001
R8001 270 1/6W
R8002 100 1/6W
CN802
GND
SAFETY SW
SWD 5V
T.REEL.P
TO CP-2 (SY-B) CN302
CASSETTE MECHANISM
T.TOP.S.
T.END.S.
FL.START.SW
TO CP-1 (SY-A) CN303
MC-1 BOARD
CAPSTAN MOTOR
MC
F/R
CAP VS
CAP FG 1
ALWAYS 13V(MC)
GND(MC)
TO CP-2 (SV-B) CN352
HEAD DRUM MOTOR
MH
DRUM PG
DRUM FG
ALWAYS 13V(MH)
DRUM VS
GND(MH)
TO CP-2 (SV-B) CN351
MECHANISM MODE DETECT SW
MC-3 BOARD
LOADING MOTOR
M.L
CN821
DEW SENSOR
CN822
SW DATA 2
SW DATA 1
SW DATA 3
ML(+)
ML(-)
DEW.S
TO CP-2 (SY-B) CN301
CDM1-12512/RP1-SPSY

VIDEO CIRCUIT BASIC BLOCK DIAGRAM


CP-1 BOARD
IC101 (LA7340) Y-SIGNAL PROCESS
PRE AMP UNIT.
IC181 (LA7320) REC/PRE.AMP
HEAD DRUM
CH1
V-HEAD
CH2
R.T
AMP
SW REC ON
L
H
RF SW P
REC CURRENT CHECK
TP181
ENV.
TP182
ENV.OUT
RF. 3 ENVELOPE OUT
PB 5V
REC 12V
PB
REC
Q1004
BUFFER
PB Y-FM
Q1052~Q1054
EQ AMP
PB H
B1001
C1024
C1025
DOC OFF(L)
RF SW P.
VR182
FILTER
REC-Y
VR181
REC.C
CURRENT AMP
Y/C MIX AMP
PB ON
RF SWITCHING PULSE
TP183
RF SW P
P.B
FM IN
FM AGC
8MHZ
H.P.F
LIM
3MHZ
L.P.F
MIX
FM DEMOD.
D.O.C DET.
DL
AGC 2
AMP
XF101
Q1002 Q1003
AMP.
Q1001
BUFF.
VR101 P.B LEVEL
CLAMP
D.O.C PULSE
AGC
AGC 1 DET
DELAY
Q1031
VR105 N.C.ADJ
L1031,Q1032 C1037~C1039
CCD 1H-DL
X2FSC
CORRELATION
D.O.C & NOIS CANCELL
D.O
NORMAL
NL DE-EM
REC (Y-FM)
1/2 fH CARRIER SHIFT
FM MODULATOR
5V DC
VR103 CARRIER
VR104 DEV.
WHITE/DARK CLIP
MAIN EMPHASIS
NL EMPHA
DETAIL EMPHA
REC(Y)
ATT
AGC. AMP
REC/EE VIDEO IN
FM OUT
PB 5V
DOC OFF(L)
VIDEO SIGNAL IN
CP-1 BOARD
IC111 (LA7332) CHROMA PROCESS
L1104,L1105 C1124,C1125 C1281
PB 5V
L.P.F
BUFFER
Q1105,Q1106
PB C
B1201 SYSTEM SW
C1201
PAL H
Q1101
XF111(2/3) 1.4MHZ L.P.F
REC C
IC161 (LA7221) INPUT SELECT
MUTE
INPUT VIDEO SIG.
AV VIDEO IN
TUNER VIDEO IN
B1601
INPUT SEL V
PB CHROMA IN
64B AMP
A.C.C AMP.
BURST EMPHA DE-EMPHA
CARRIER BALANCE
MAIN CONVERTER
P.B 627KHZ
REC 4.43MHZ
4.43MHZ
5.06MHZ
R/P
R/P DET
A.C.C DET.
REC CHROMA OUT
KILLER
627KHZ
REC-C
VIDEO IN
XF111(1/3)
4.43MHZ B.P.F
Q1151 Q1103-Q1104
P.B CHROMA
DL131
COMB FILTER
P.B ACK
P.B CHROMA OUT
5.06MHZ B.P.F
XF111 (3/3)
ACK DET.
BURST ID-DET.
REC AFC
SW
REC APC
CONTROL
4.43MHZ VXO
4.43MHZ XO
4.43MHZ CW
4.43MHZ X-T
X1101
RF SW P
SIGNAL DET.
LP
SW 25
SUB CONVERTER
CW 4.43MHZ
90° PHASE SHIFT (PS)
B-ID
HD
B-ID LOGIC
PB APC
3rd LOCK PROTECT
FSC
Q1102
BUFFER
X2
X2FSC TO IC102 1H
1/8
5.06MHZ VCO
R1102,R1104 C1105,C1106
INTEG-RATION
MISLOCK OUT
PB SLD
PLL LOCK
PULSE GEN.
C-SYNC IN
BGP 1
BGP 2
MESECAM H
N/P/S DET.
K J I H G F E D C B A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

VIDEO CIRCUIT BASIC BLOCK DIAGRAM


CP-1 BOARD
IC101 (LA7340) Y-SIGNAL PROCESS
FM IN
FM AGC
8MHZ
H.P.F
LIM
3MHZ
L.P.F
MIX
FM DEMOD.
L.P.F
P.B
REC
L.P.F
3MHZ
D.O.C DET.
DL
AGC 2
AMP
XF101
L.P.F
3MHZ
VR101
P.B LEVEL
Q1002 Q1003
AMP.
Q1001
BUFF.
CLAMP
CLAMP
Q1031
BUFFER
VR105
N.C.ADJ
L1031,Q1032
C1037-C1039
L.P.F
X2FSC
CCD
1H-DL
IC102
CORRELATION
LIM
LIM
AMP
D.O.C & NOIS CANCELL
D.O
NORMAL
NL DE-EMPHA
NOISE CANCELL
PICTURE CONTROL
6dB AMP
Y/C MIC
SYNC AMP
P.B Y
F.B. CLAMP
VIDEO AMP
DRIVE
VIDEO OUT
Q1601
BUFFER
VIDEO OUT TO AV
Q1602,Q1631
EQ
B6003,Q6003
MOMENTARY MUTE
V.MUTE (TM-1)
VIDEO OUT TO RF-CONV.
D.O.C PULSE
AGC
AGC 1 DET
DELAY
SYNC SEP.
L.P.F
P.B CHROMA
MUTE OR VD-INSART
AGC CONT.
REC (Y-FM)
1/2 fh CARRIER SHIFT
FM MODULATOR
5V DC
VR103 CARRIER
VR104 DEV.
WHITE/ DARK CLIP
MAIN EMPHASIS
NL EMPHA
DETAIL EMPHA
REC(Y)
ATT
AGC. AMP
REC (VIDEO Y/C)
REC/EE VIDEO IN
SYNC OUT
CONTROL IN
CHROMA IN
VD IN
FM OUT
VIDEO SIGNAL IN
PB 5V
DOC OFF(L)
V-LOCK PULSE (VLP) IN FROM SERVO
PICTURE CONTROL VR
COMPOSITE SYNC. TO SERVO
CP-1 BOARD
IC111 (LA7332) CHROMA PROCESS
PB CHROMA IN
6dB AMP
A.C.C AMP.
BURST EMPHA DE-EMPHA
CARRIER BALANCE
627KHZ
MAIN CONVERTER
4.43MHZ
5.06MHZ
VIDEO IN
XF111(1/3)
4.43MHZ B.P.F
Q1151 Q1103-Q1104
AMP
DL131
COMB FILTER
AMP
P.B ACK
P.B CHROMA OUT
KILLER
REC-C
VR102
SWD 5V
EE LEVEL
P.B CHROMA
R/P
R/P DET
A.C.C DET.
CHROMA OUT
KILLER
627KHZ
XF111 (3/3)
5.06MHZ B.P.F
ACK DET.
SW
REC APC
CONTROL
4.43MHZ VXO
4.43MHZ XO
4.43MHZ CW
4.43MHZ X-TAL X1101
BURST ID-DET.
REC AFC
SUB CONVERTER
CW
627KHZ
PB APC
3rd LOCK PROTECT
FSC
Q1102
BUFFER
4.43MHZ FSC SIGNAL TO SERVO
SIGNAL DET.
LP
SW 25
SW 25
90° PHASE SHIFT (PS)
B-ID
HD
B-ID LOGIC
X2
X2FSC TO IC102 1H-DL
HD
BGP 2
PULSE GEN.
C-SYNC IN
C-SYNC
1/8
5.06MHZ
PB SLD
N/P/S DET.
5.06MHZ VCO
CONTROL
R1102,R1104 C1105,C1106
INTEG-RATION
MISLOCK OUT
PLL LOCK
BGP 1
VD-1 BOARD
IC171 (BA7025L) PAL/SECAM DISCRIMINATION
REC C
PB C
PB 5V
CHROMA IN
BUST GATE AMP
BGP IN
XF171
4.16MHZ FILTER
DET.
COMP 1
INTEG-RATION
COMP 2
OUTPUT TO CHROMA PROCESS
MESECAM H
Q1701
PAL H
XF172
1/2fh PEAKING
Q1701
R1701 R1702
B.G.P. DET.
B.G
BDV1-12583/LP2H-GF
8
9
10
11
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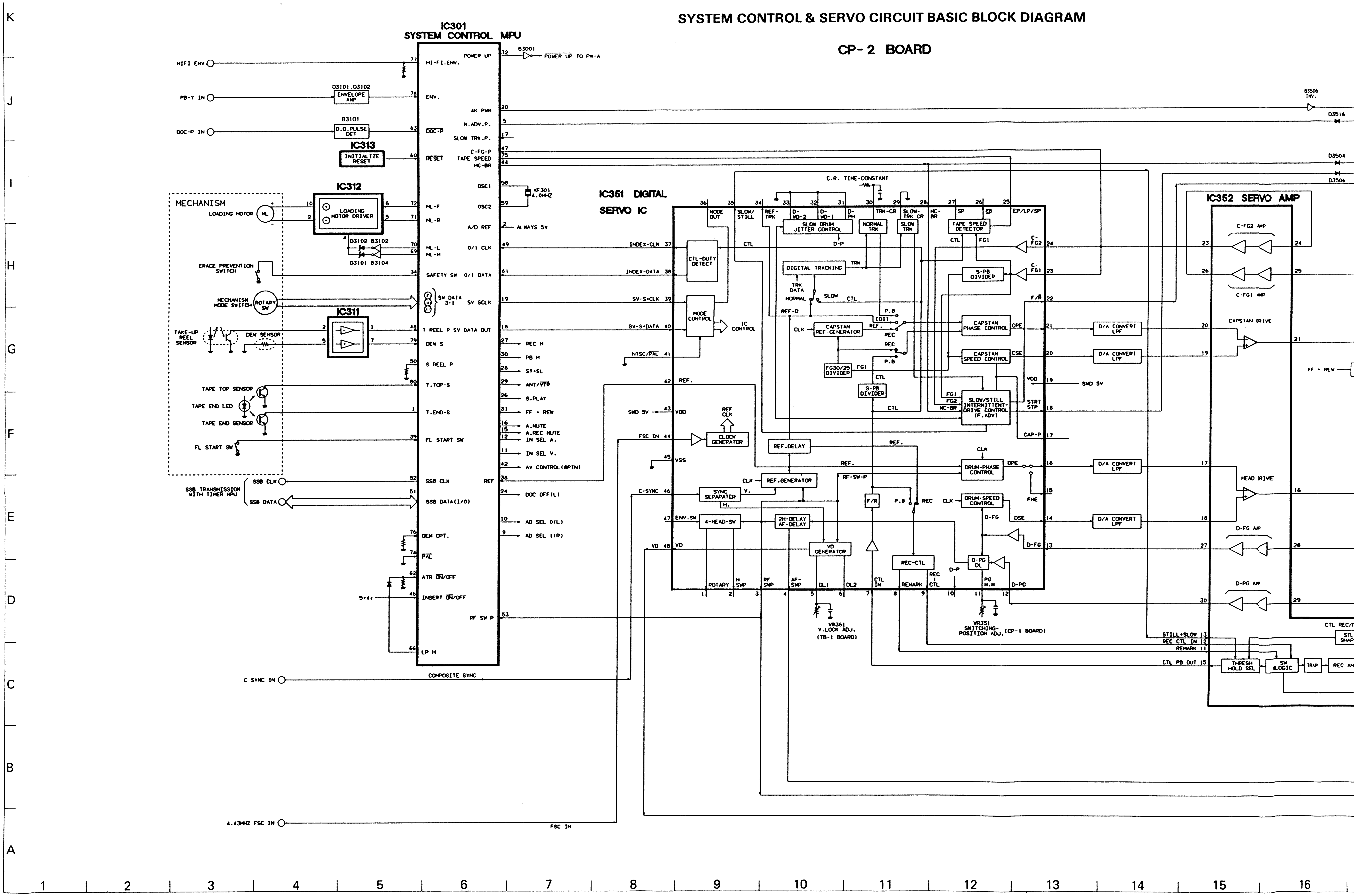
19
20
21
22
23
24

SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM

CP-2 BOARD


IC301
SYSTEM CONTROL MPU
HIFI ENV.
PB-Y IN
DOC-P IN
Q3101,Q3102
ENVELOPE AMP
B3101
D.O.PULSE DET
IC313
INITIALIZE RESET
IC312
LOADING MOTOR DRIVER
MECHANISM
LOADING MOTOR
ML
D3102 B3102
D3101 B3104
ERACE PREVENTION SWITCH
MECHANISM MODE SWITCH
ROTARY SW
IC311
TAKE-UP REEL SENSOR
DEW SENSOR
TAPE TOP SENSOR
TAPE END LED
TAPE END SENSOR
FL START SW
SSB TRANSMISSION WITH TIMER MPU
SSB CLK
SSB DATA
C SYNC IN
4.43MHZ FSC IN
HI-FI.ENV.
ENV.
DOC-P
RESET
ML-F
ML-R
ML-L
ML-H
SAFETY SW
SW DATA 3-1
T REEL P
DEW S
S REEL P
T.TOP-S
T.END-S
FL START SW
SSB CLK
SSB DATA(I/O)
OEM OPT.
PAL
ATR ON/OFF
INSERT ON/OFF
LP H
5Vdc
POWER UP
B3001
POWER UP TO PW-A
4K PWM
N.ADV.P.
SLOW TRK.P.
C-FG-P
TAPE SPEED
MC-BR
OSC1
OSC2
XF301 4.0MHZ
A/D REF
ALWAYS 5V
0/1 CLK
0/1 DATA
SV SCLK
SV DATA OUT
REC H
PB H
ST+SL
ANT/VTR
S.PLAY
FF + REW
A.MUTE
A.REC MUTE
IN SEL A.
IN SEL V.
AV CONTROL(8PIN)
REF
DOC OFF(L)
AD SEL 0(L)
AD SEL 1(R)
RF SW P
COMPOSITE SYNC
FSC IN
IC351 DIGITAL SERVO IC
INDEX-CLK
INDEX-DATA
SV-S-CLK
SV-S-DATA
NTSC/PAL
REF.
SWD 5V
VDD
FSC IN
VSS
C-SYNC
ENV.SW
VD
CTL-DUTY DETECT
MODE CONTROL
IC CONTROL
REF CLK
CLOCK GENERATOR
SYNC SEPARATOR
4-HEAD-SW
2H-DELAY AF-DELAY
VD GENERATOR
REF.DELAY
REF.GENERATOR
RF-SW-P
MODE OUT
SLOW/STILL
REF-TRK
D-WD-2
D-WD-1
D-PH
C.R. TIME-CONSTANT
TRK-CR
SLOW-TRK CR
MC-BR
SP
EP/LP/SP
SLOW DRUM JITTER CONTROL
NORMAL TRK
SLOW TRK
TAPE SPEED DETECTOR
DIGITAL TRACKING
TRK DATA
NORMAL
SLOW
CTL
REF-D
EDIT
CAPSTAN REF-GENERATOR
FG30/25 DIVIDER
S-PB DIVIDER
CAPSTAN PHASE CONTROL
CAPSTAN SPEED CONTROL
SLOW/STILL INTERMITTENT-DRIVE CONTROL (F.ADV)
DRUM-PHASE CONTROL
DRUM-SPEED CONTROL
D-PG DL
REC-CTL
F/R
C-FG2
C-FG1
F/R
CPE
CSE
STRT STP
CAP-P
DPE
FHE
DSE
D-FG
D-PG
ROTARY
H SWP
RF SWP
AF-SWP
DL1
DL2
CTL IN
REMARK
REC CTL
PG M.M
VR361 V.LOCK ADJ. (TB-1 BOARD)
VR351 SWITCHING-POSITION ADJ. (CP-1 BOARD)
D/A CONVERT LPF
SWD 5V
IC352 SERVO AMP
C-FG2 AMP
C-FG1 AMP
CAPSTAN DRIVE
HEAD DRIVE
D-FG AMP
D-PG AMP
FF + REW
B3506 INV.
D3516
D3504
D3506
STILL+SLOW
REC CTL IN
REMARK
CTL PB OUT
THRESH HOLD SEL
SW LOGIC
TRAP
CTL REC/P
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
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15
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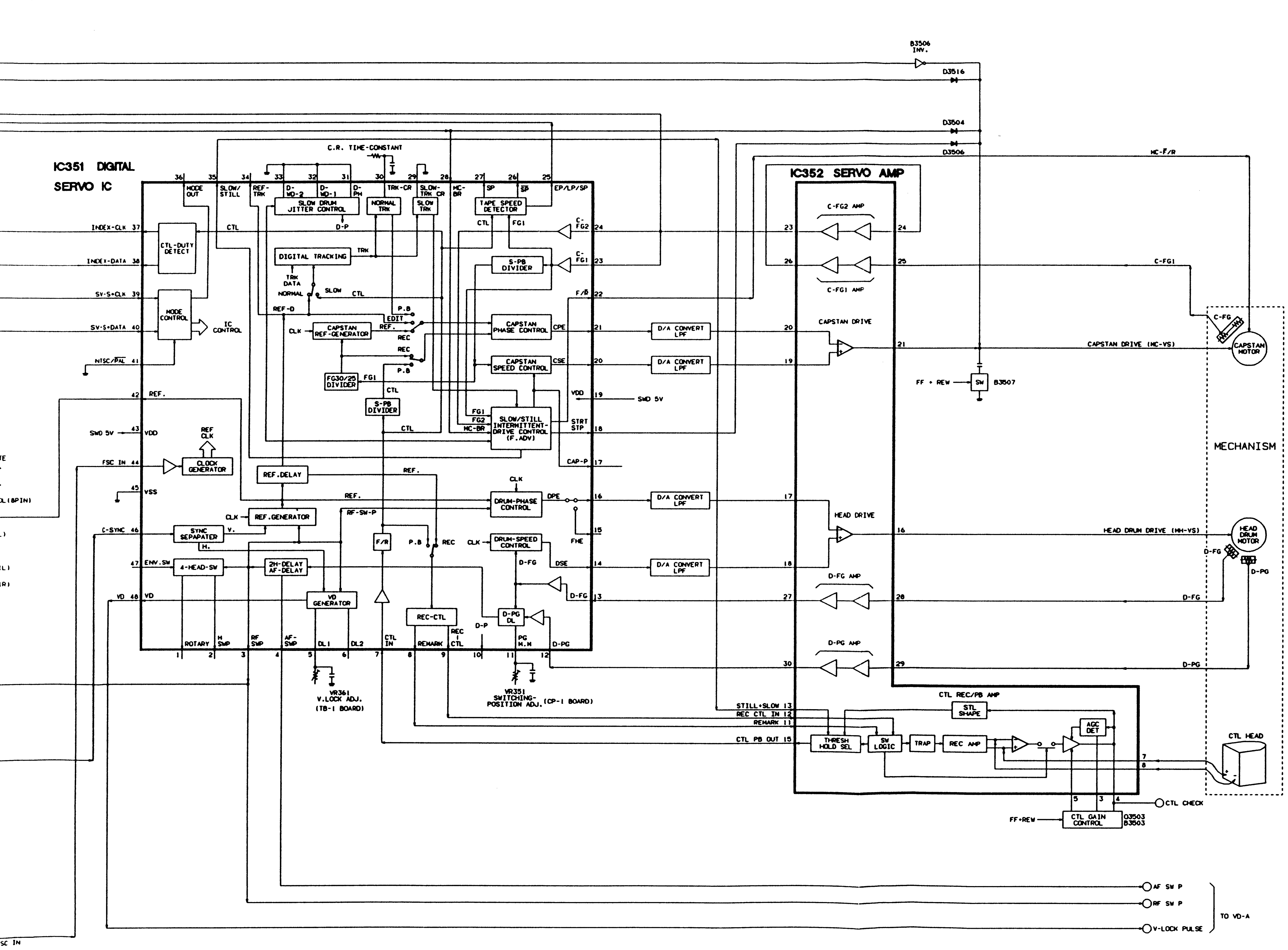
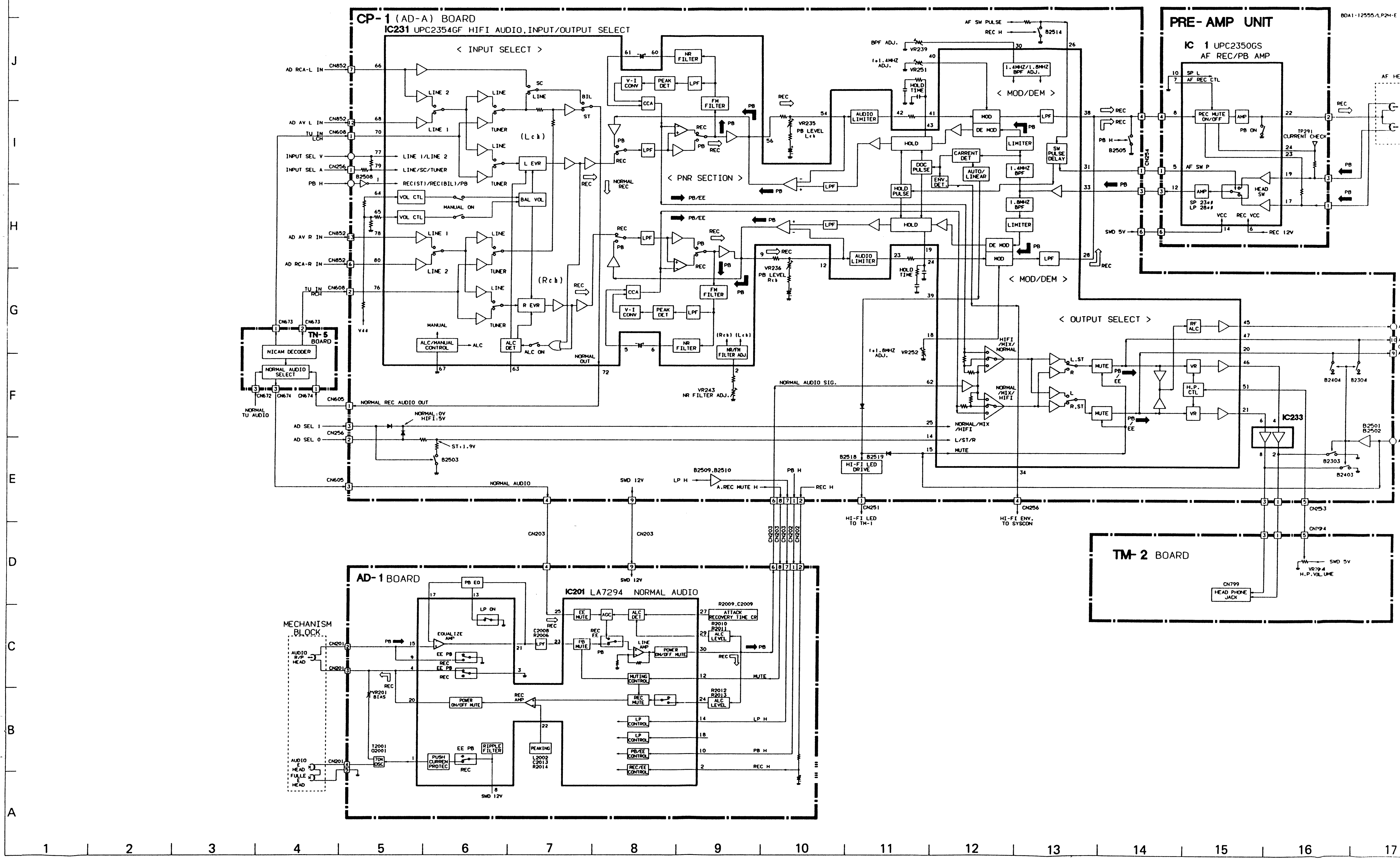
SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM

CP-2 BOARD

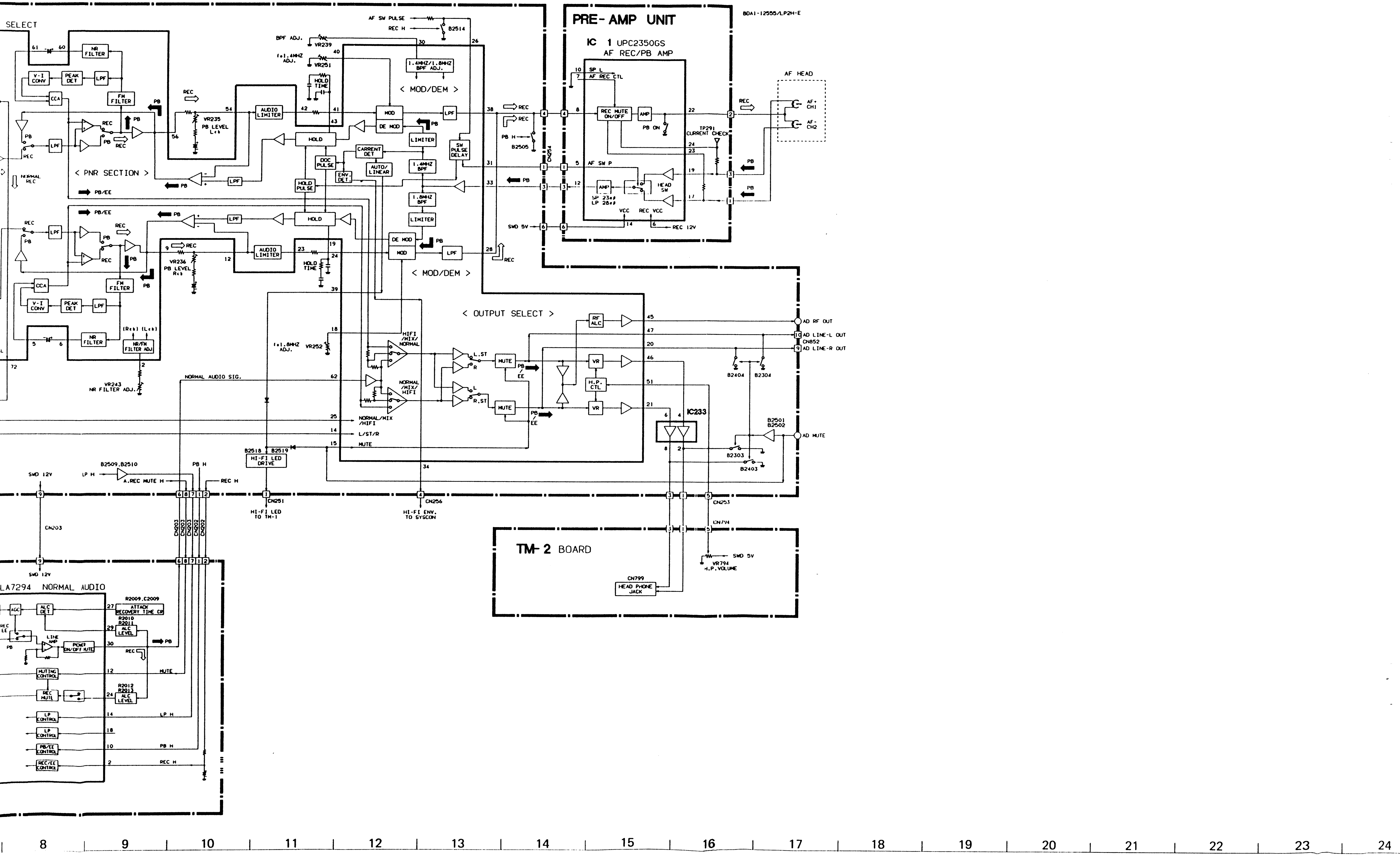


ER UP TO PW-A
B3506 INV.
D3516
D3504
D3506
MC-F/R
IC351 DIGITAL SERVO IC
C.R. TIME-CONSTANT
MODE OUT
SLOW/ STILL
REF-TRK
D-WD-2
D-WD-1
D-PH
TRK-CR
SLOW-TRK CR
MC-BR
SP
EP/LP/SP
SLOW DRUM JITTER CONTROL
NORMAL TRK
SLOW TRK
TAPE SPEED DETECTOR
INDEX-CLK 37
INDEX-DATA 38
SV-S-CLK 39
SV-S-DATA 40
NTSC/PAL 41
REF. 42
SWD 5V 43 VDD
FSC IN 44
45 VSS
C-SYNC 46
47 ENV.SW
VD 48 VD
CTL-DUTY DETECT
MODE CONTROL
IC CONTROL
DIGITAL TRACKING
TRK DATA
NORMAL
SLOW
CTL
REF-D
EDIT
CLK
CAPSTAN REF-GENERATOR
FG30/25 DIVIDER
S-PB DIVIDER
CAPSTAN PHASE CONTROL
CAPSTAN SPEED CONTROL
SLOW/STILL INTERMITTENT-DRIVE CONTROL (F.ADV)
FG1
FG2
MC-BR
C-FG2 24
C-FG1 23
F/R 22
CPE 21
CSE 20
VDD 19
STRT STP 18
CAP-P 17
SWD 5V
REF CLK
CLOCK GENERATOR
REF.DELAY
REF.GENERATOR
SYNC SEPAPATER
H.
V.
4-HEAD-SW
2H-DELAY AF-DELAY
VD GENERATOR
RF-SW-P
F/R
P.B
REC
DRUM-PHASE CONTROL
DPE 16
FHE 15
DRUM-SPEED CONTROL
DSE 14
D-FG 13
D-PG DL
REC-CTL
D-P
ROTARY
H SWP
RF SWP
AF-SWP
DL1
DL2
CTL IN
REMARK
REC CTL
PG M.M
D-PG
VR361 V.LOCK ADJ. (TB-1 BOARD)
VR351 SWITCHING-POSITION ADJ. (CP-1 BOARD)
D/A CONVERT LPF
IC352 SERVO AMP
C-FG2 AMP
C-FG1 AMP
CAPSTAN DRIVE
HEAD DRIVE
D-FG AMP
D-PG AMP
C-FG1
CAPSTAN DRIVE (MC-VS)
HEAD DRUM DRIVE (MH-VS)
D-FG
D-PG
FF + REW
SW B3507
C-FG
CAPSTAN MOTOR
MECHANISM
HEAD DRUM MOTOR
CTL HEAD
STILL+SLOW 13
REC CTL IN 12
REMARK 11
CTL PB OUT 15
CTL REC/PB AMP
STL SHAPE
THRESH HOLD SEL
SW LOGIC
TRAP
REC AMP
AGC DET
CTL CHECK
FF+REW
CTL GAIN CONTROL
D3503 B3503
AF SW P
RF SW P
V-LOCK PULSE
TO VD-A
L(8PIN)
SC IN
BDSI-12555/LP2H-E

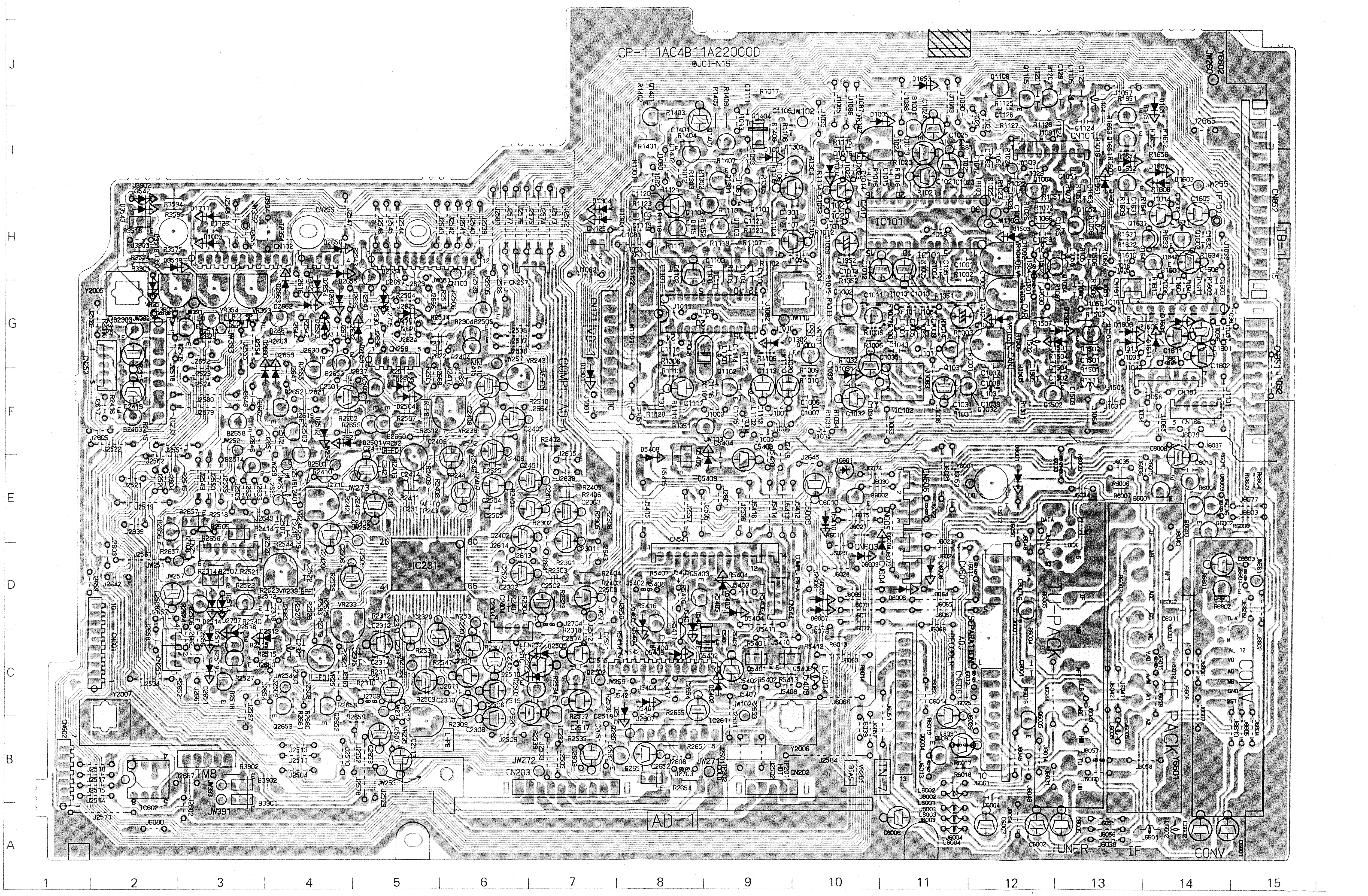
HIFI AUDIO & NORMAL AUDIO CIRCUIT BASIC BLOCK DIAGRAM


BDA1-12555/LP2H-E
CP-1 (AD-A) BOARD
IC231 UPC2354GF HIFI AUDIO, INPUT/OUTPUT SELECT
< INPUT SELECT >
< PNR SECTION >
< MOD/DEM >
< OUTPUT SELECT >
AD RCA-L IN
AD AV L IN
TU IN LCH
INPUT SEL V
INPUT SEL A
PB H
AD AV R IN
AD RCA-R IN
TU IN RCH
LINE 1/LINE 2
LINE/SC/TUNER
REC(ST)/REC(BIL)/PB
LINE 1
LINE 2
TUNER
SC
BIL
ST
(Lch)
(Rch)
L EVR
R EVR
BAL VOL
VOL CTL
MANUAL ON
ALC/MANUAL CONTROL
ALC DET
ALC ON
NORMAL OUT
V-I CONV
PEAK DET
LPF
CCA
NR FILTER
FM FILTER
PB/EE
VR235 PB LEVEL Lch
VR236 PB LEVEL Rch
AUDIO LIMITER
HOLD
HOLD TIME
HOLD PULSE
DOC PULSE
CARRENT DET
AUTO/LINEAR
ENV. DET.
MOD
DE MOD
LIMITER
1.4MHZ BPF
1.8MHZ BPF
1.4MHZ/1.8MHZ BPF ADJ.
SW PULSE DELAY
AF SW PULSE
REC H
BPF ADJ.
VR239
f=1.4MHZ ADJ.
VR251
f=1.8MHZ ADJ.
VR252
VR243 NR FILTER ADJ.
NR/FM FILTER ADJ
HIFI /MIX/ NORMAL
NORMAL /MIX/ HIFI
L.ST
R.ST
MUTE
RF ALC
VR
H.P. CTL
IC233
NORMAL/MIX /HIFI
L/ST/R
NORMAL AUDIO SIG.
NORMAL REC AUDIO OUT
NORMAL AUDIO
AD SEL 1
AD SEL 0
NORMAL:0V HIFI:5V
ST:1.9V
B2503
B2505
B2508
B2509, B2510
B2514
B2518 B2519
HI-FI LED DRIVE
A.REC MUTE H
LP H
SWD 12V
SWD 5V
REC 12V
HI-FI LED TO TM-1
HI-FI ENV. TO SYSCON
CN852
CN608
CN256
CN605
CN254
CN251
CN253
CN203
CN202
CN673
CN672
CN674
TN-5 BOARD
NICAM DECODER
NORMAL AUDIO SELECT
NORMAL TU AUDIO
PRE-AMP UNIT
IC 1 UPC2350GS AF REC/PB AMP
SP L
AF REC CTL
REC MUTE ON/OFF
AMP
PB ON
AF SW P
HEAD SW
SP 23## LP 28##
TP291 CURRENT CHECK
AF HE
B2404
B2304
B2501 B2502
B2303
B2403
CN794
TM-2 BOARD
CN799 HEAD PHONE JACK
VR794 H.P.VOLUME
AD-1 BOARD
IC201 LA7294 NORMAL AUDIO
MECHANISM BLOCK
AUDIO R/P HEAD
AUDIO E HEAD
FULL E HEAD
CN201
PB EQ
LP ON
EQUALIZE AMP
EE PB
REC EE PB
VR201 BIAS
POWER ON/OFF MUTE
REC AMP
PEAKING
L2002 C2013 R2014
T2001 Q2001
70K OSC
PUSH CURREN PROTEC
RIPPLE FILTER
C2008 R2006
EE MUTE
AGC
ALC DET
PB MUTE
LINE AMP
POWER ON/OFF MUTE
MUTING CONTROL
REC MUTE
LP CONTROL
PB/EE CONTROL
REC/EE CONTROL
R2009, C2009 ATTACK RECOVERY TIME CR
R2010 R2011 ALC LEVEL
R2012 R2013 ALC LEVEL
MUTE
REC H
PB H
LP H
K J I H G F E D C B A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

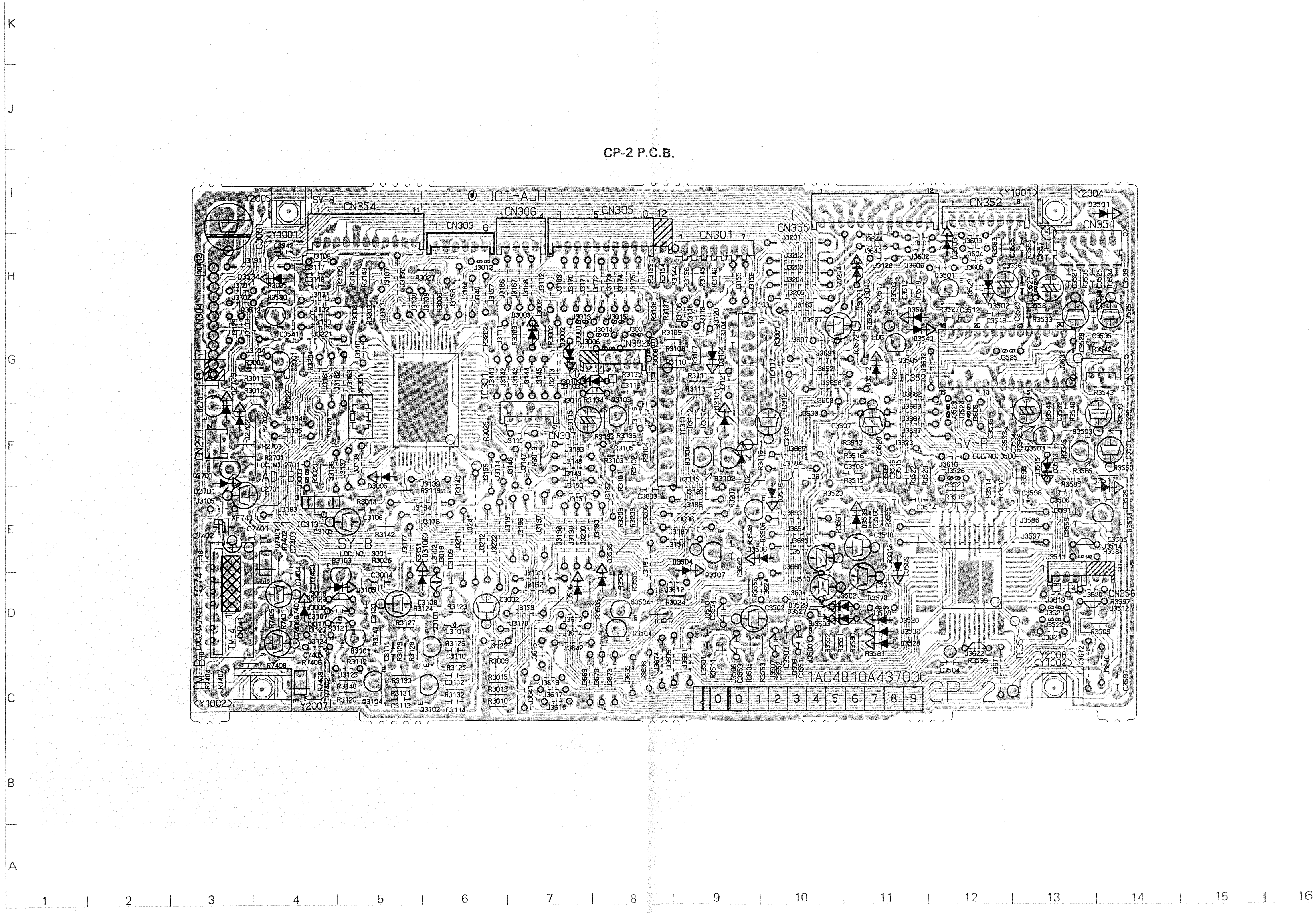
HIFI AUDIO & NORMAL AUDIO CIRCUIT BASIC BLOCK DIAGRAM


BDA1-12555/LP2H-E
SELECT
NR FILTER
V-I CONV
PEAK DET
LPF
CCA
FM FILTER
PB
REC
VR235 PB LEVEL Lch
AUDIO LIMITER
< PNR SECTION >
PB/EE
NORMAL REC
BPF ADJ.
VR239
f=1.4MHZ ADJ.
VR251
HOLD TIME
AF SW PULSE
REC H
B2514
1.4MHZ/1.8MHZ BPF ADJ.
< MOD/DEM >
MOD
DE MOD
LIMITER
HOLD
DOC PULSE
CARRENT DET
AUTO/LINEAR
ENV DET
HOLD PULSE
1.4MHZ BPF
1.8MHZ BPF
SW PULSE DELAY
LPF
B2505
PB H
CN254
SWD 5V
VR236 PB LEVEL Rch
NR/FM FILTER ADJ
(Rch) (Lch)
VR243 NR FILTER ADJ.
f=1.8MHZ ADJ. VR252
HIFI /MIX/ NORMAL
NORMAL /MIX/ HIFI
NORMAL AUDIO SIG.
NORMAL/MIX /HIFI
L/ST/R
MUTE
< OUTPUT SELECT >
L.ST
R.ST
PB / EE
RF ALC
VR
H.P. CTL
IC233
AD RF OUT
AD LINE-L OUT
CN852
AD LINE-R OUT
B2404
B2304
B2501 B2502
AD MUTE
B2303
B2403
B2518 B2519
HI-FI LED DRIVE
B2509,B2510
LP H
A.REC MUTE H
PB H
REC H
SWD 12V
CN203
CN251
HI-FI LED TO TM-1
CN256
HI-FI ENV. TO SYSCON
CN202
CN253
CN794
PRE-AMP UNIT
IC 1 UPC2350GS
AF REC/PB AMP
SP L
AF REC CTL
REC MUTE ON/OFF
AMP
PB ON
TP291 CURRENT CHECK
AF SW P
SP 23##
LP 28##
HEAD SW
VCC
REC VCC
REC 12V
AF HEAD
AF-CH1
AF-CH2
TM-2 BOARD
CN799
HEAD PHONE JACK
SWD 5V
VR794 H.P.VOLUME
LA7294 NORMAL AUDIO
AGC
ALC DET
R2009,C2009
ATTACK RECOVERY TIME CR
R2010 R2011
ALC LEVEL
LINE AMP
POWER ON/OFF MUTE
MUTING CONTROL
REC MUTE
R2012 R2013
LP CONTROL
PB/EE CONTROL
REC/EE CONTROL
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

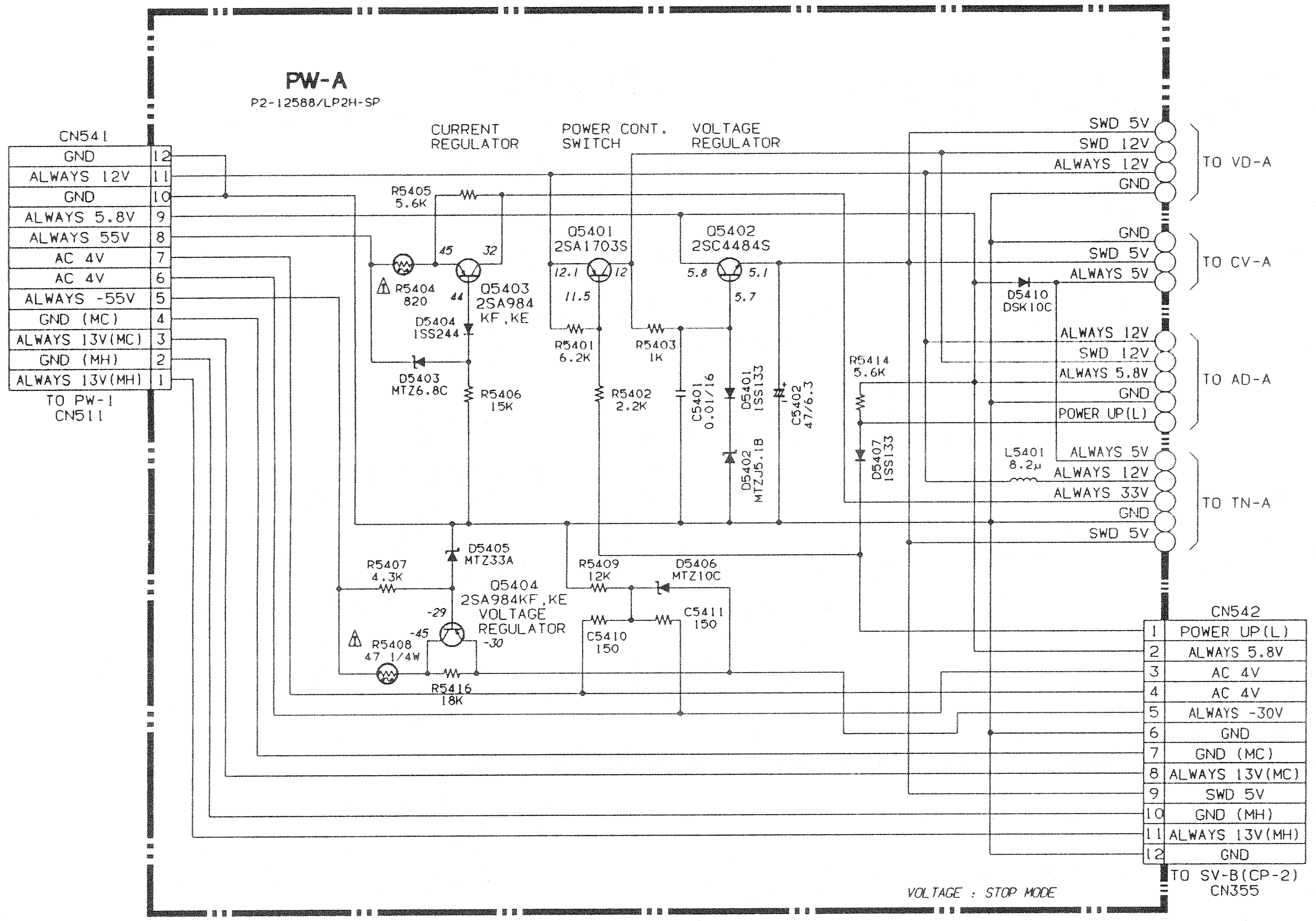
CP-1 P.C.B.


CP-1 1AC4B11A22000D
IC231
IC101
IC102
IC191
IC261
IC601
IC602
CN201
CN202
CN203
CN541
CN601
CN602
CN851
CN852
TB-1
AD-1
COMP-AD
SEPARATION ADJ
DECODER
IF PACK
TU PACK
CONV
TUNER
IF
IN-7
BIAS
TM8
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
I
J

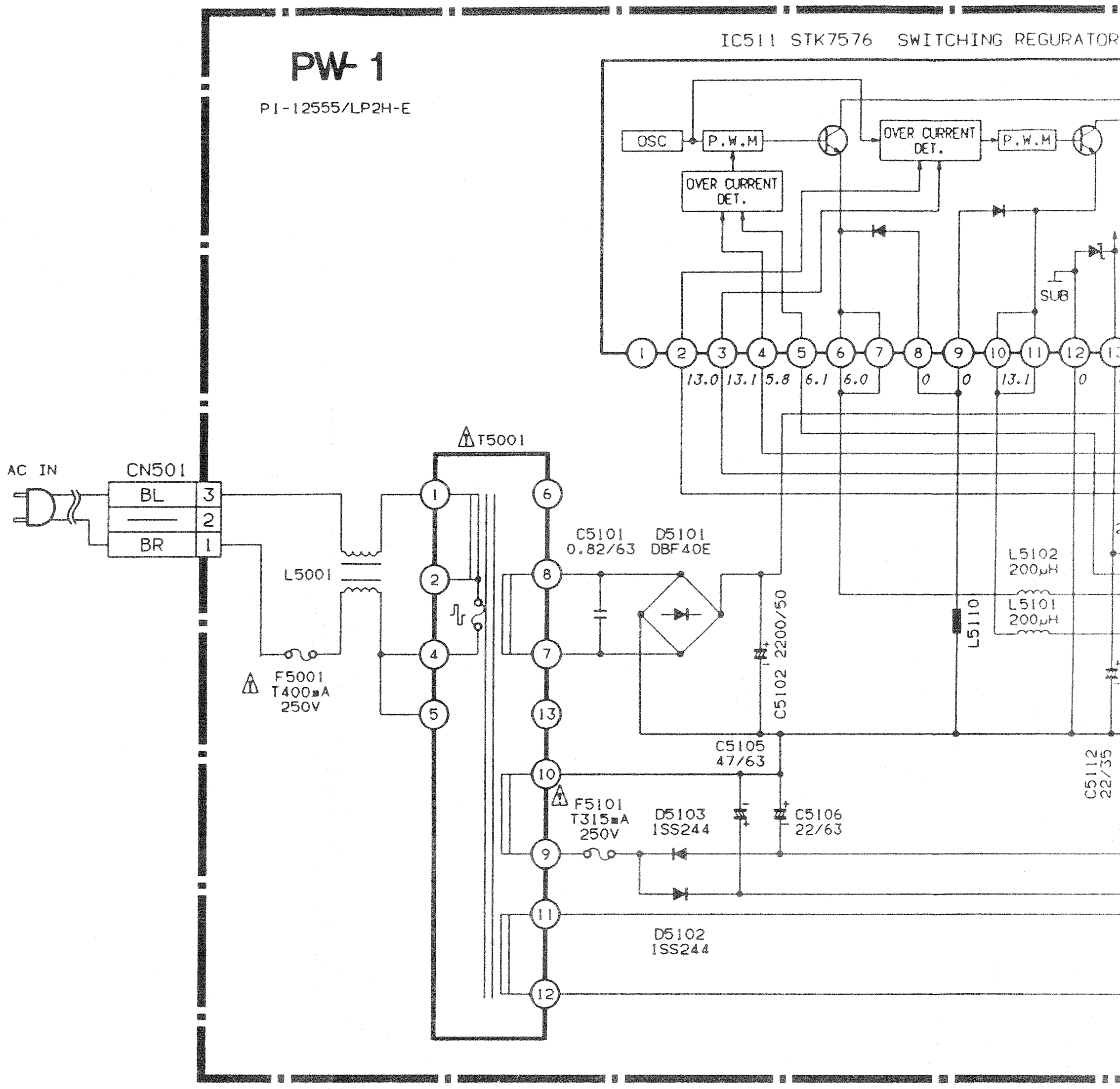
CP-2 P.C.B.


K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
JCI-AuH
CN354
CN303
CN306
CN305
CN301
CN355
CN352
CN351
CN353
CN356
CN304
CN271
CN307
CN302
IC301
IC311
IC312
IC313
IC352
IC351
IC741
Y2005
Y2004
Y2006
Y2007
(Y1001)
(Y1002)
SV-B
SY-B
AD-B
TM-B
LOC. NO. 3001-
LOC. NO. 3500-
LOC. NO. 2701-
LOC. NO. 7401-
1AC4B10A43700C
0 0 1 2 3 4 5 6 7 8 9
CP-2

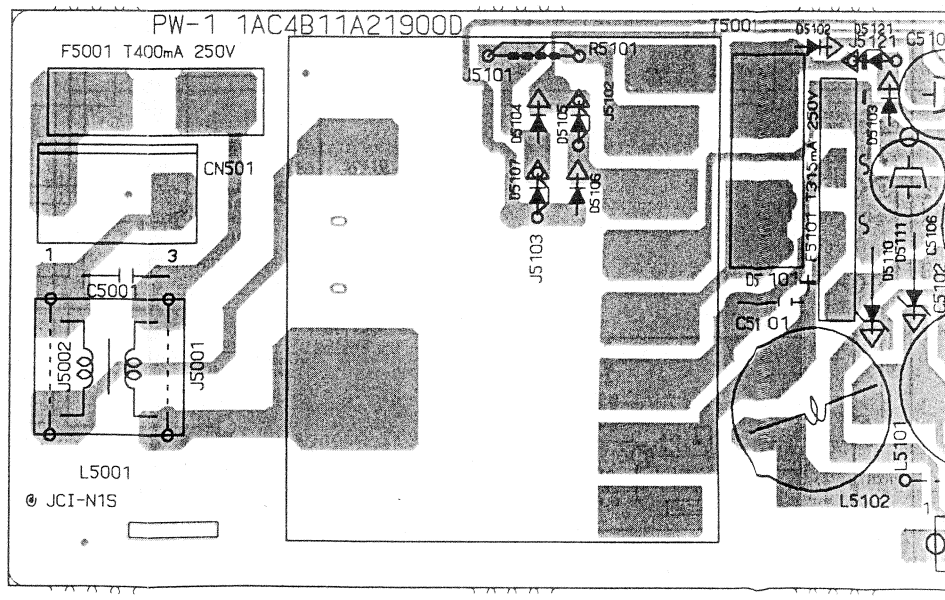
CP-1 BOARD (PW-A) POWER SUPPLY CIRCUIT DIAGRAM


PW-A
P2-12588/LP2H-SP
CN541
GND 12
ALWAYS 12V 11
GND 10
ALWAYS 5.8V 9
ALWAYS 55V 8
AC 4V 7
AC 4V 6
ALWAYS -55V 5
GND (MC) 4
ALWAYS 13V(MC) 3
GND (MH) 2
ALWAYS 13V(MH) 1
TO PW-1
CN511
CURRENT REGULATOR
POWER CONT. SWITCH
VOLTAGE REGULATOR
R5405 5.6K
R5404 820
Q5403 2SA984 KF,KE
D5404 1SS244
D5403 MTZ6.8C
R5406 15K
Q5401 2SA1703S
R5401 6.2K
R5402 2.2K
Q5402 2SC4484S
R5403 1K
C5401 0.01/16
D5401 1SS133
D5402 MTZJ5.1B
C5402 47/6.3
R5414 5.6K
D5407 1SS133
D5410 DSK10C
L5401 8.2μ
D5405 MTZ33A
R5407 4.3K
Q5404 2SA984KF,KE VOLTAGE REGULATOR
R5408 47 1/4W
R5416 18K
R5409 12K
D5406 MTZ10C
C5410 150
C5411 150
45
32
44
12.1
12
11.5
5.8
5.1
5.7
-29
-45
-30
SWD 5V
SWD 12V
ALWAYS 12V
GND
TO VD-A
GND
SWD 5V
ALWAYS 5V
TO CV-A
ALWAYS 12V
SWD 12V
ALWAYS 5.8V
GND
POWER UP(L)
TO AD-A
ALWAYS 5V
ALWAYS 12V
ALWAYS 33V
GND
SWD 5V
TO TN-A
CN542
1 POWER UP(L)
2 ALWAYS 5.8V
3 AC 4V
4 AC 4V
5 ALWAYS -30V
6 GND
7 GND (MC)
8 ALWAYS 13V(MC)
9 SWD 5V
10 GND (MH)
11 ALWAYS 13V(MH)
12 GND
TO SV-B(CP-2)
CN355
VOLTAGE : STOP MODE

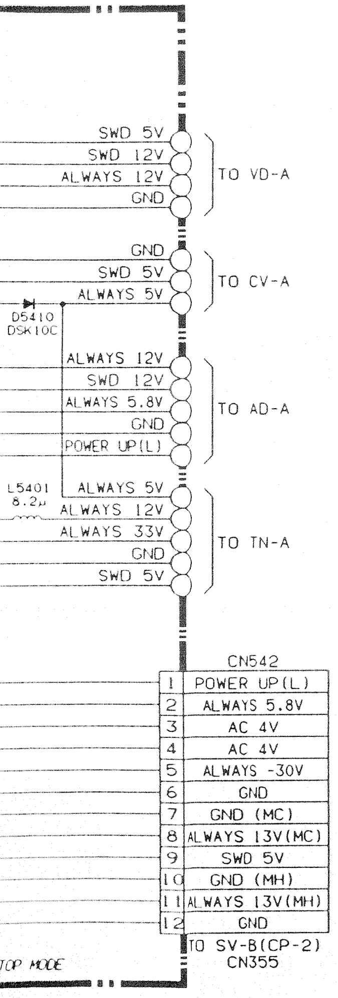
PW-1 BOARD POWER SUPPLY CIRCU


PW-1
P1-12555/LP2H-E
IC511 STK7576 SWITCHING REGURATOR
OSC
P.W.M
OVER CURRENT DET.
OVER CURRENT DET.
P.W.M
SUB
1
2
3
4
5
6
7
8
9
10
11
12
13.0
13.1
5.8
6.1
6.0
0
0
13.1
0
AC IN
CN501
BL 3
2
BR 1
L5001
F5001 T400mA 250V
T5001
C5101 0.82/63
D5101 DBF40E
C5102 2200/50
L5110
L5102 200μH
L5101 200μH
C5105 47/63
F5101 T315mA 250V
D5103 1SS244
C5106 22/63
D5102 1SS244
C5112 22/35

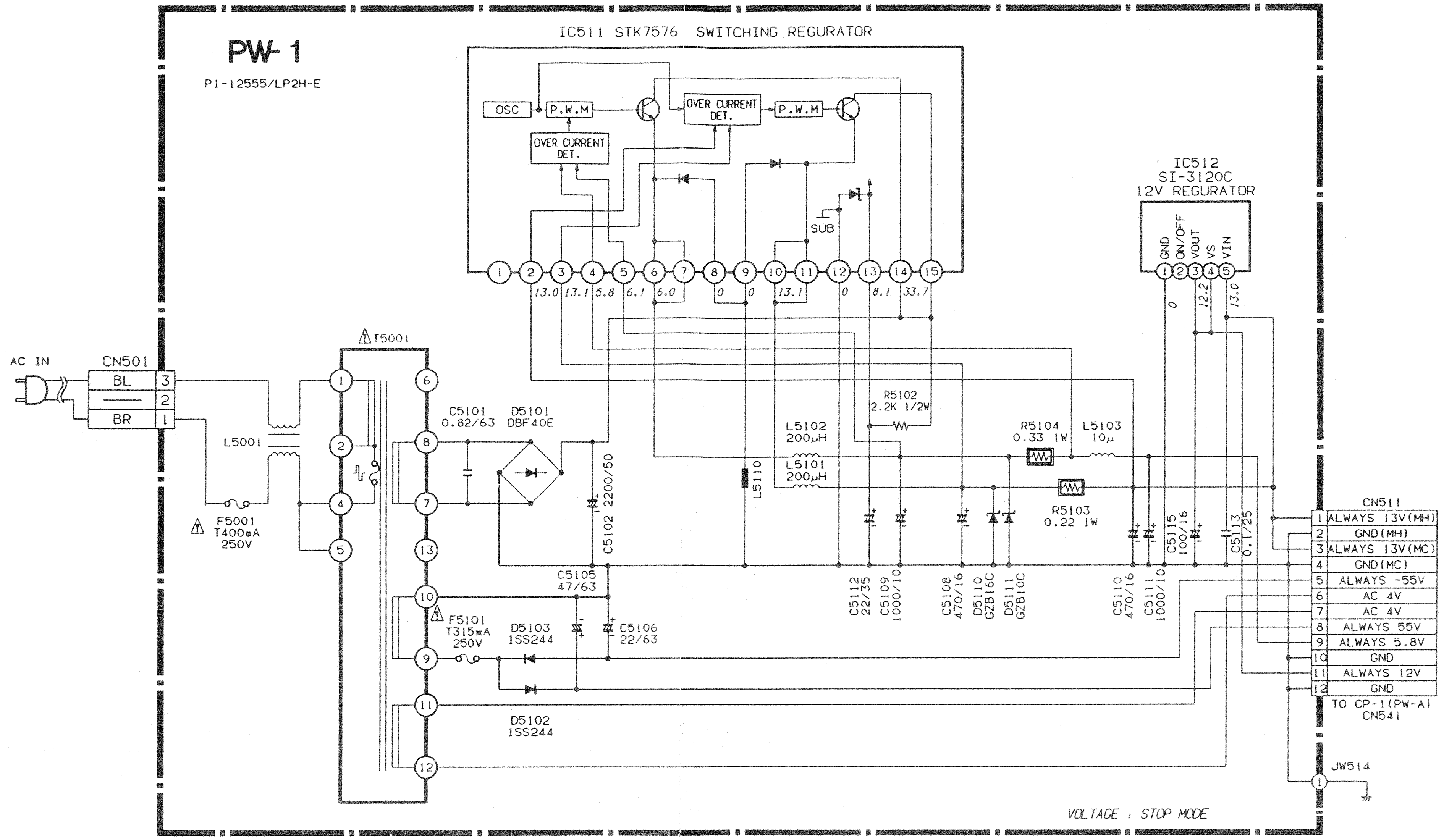
PW-1 P.C.B.


PW-1 1AC4B11A21900D
F5001 T400mA 250V
CN501
C5001
J5002
J5001
L5001
JCI-N1S
T5001
R5101
J5101
D5104
D5105
D5107
D5106
J5102
J5103
L5101
L5102
C5101
D5103

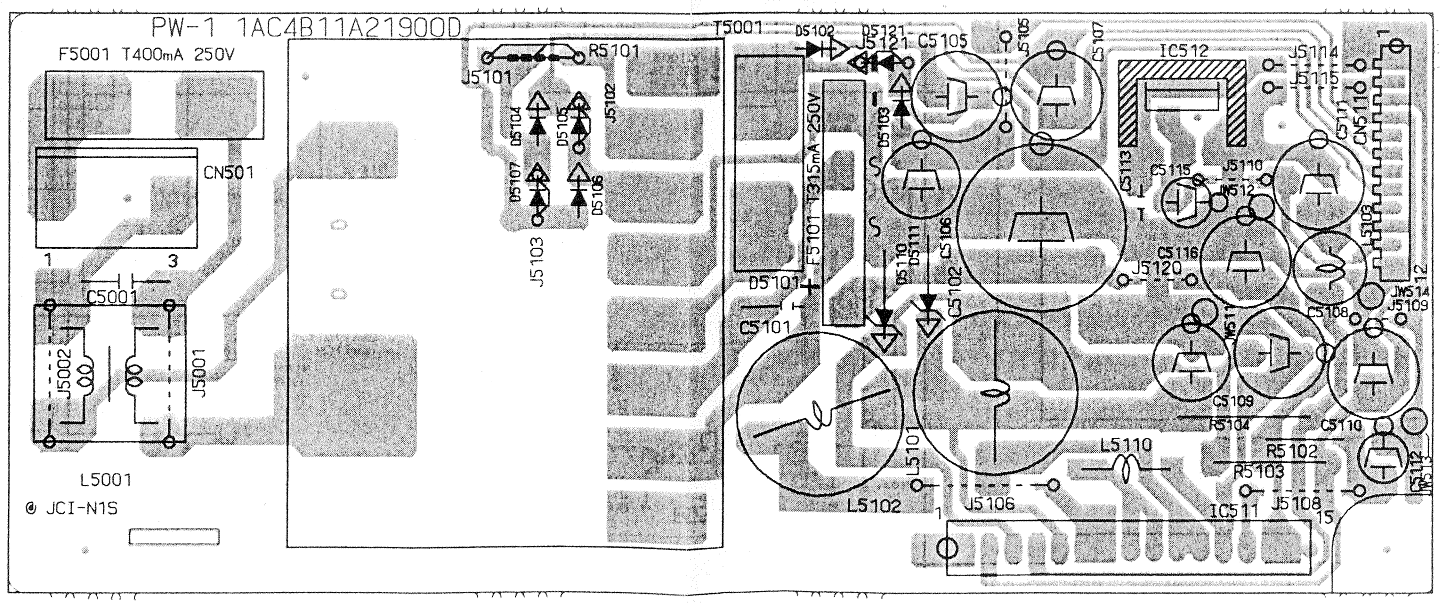
AM


SWD 5V
SWD 12V
ALWAYS 12V
GND
TO VD-A
GND
SWD 5V
ALWAYS 5V
TO CV-A
D5410
DSK10C
ALWAYS 12V
SWD 12V
ALWAYS 5.8V
GND
POWER UP(L)
TO AD-A
L5401
8.2μ
ALWAYS 5V
ALWAYS 12V
ALWAYS 33V
GND
SWD 5V
TO TN-A
CN542
1 POWER UP(L)
2 ALWAYS 5.8V
3 AC 4V
4 AC 4V
5 ALWAYS -30V
6 GND
7 GND (MC)
8 ALWAYS 13V(MC)
9 SWD 5V
10 GND (MH)
11 ALWAYS 13V(MH)
12 GND
TO SV-B(CP-2)
CN355
TOP MODE

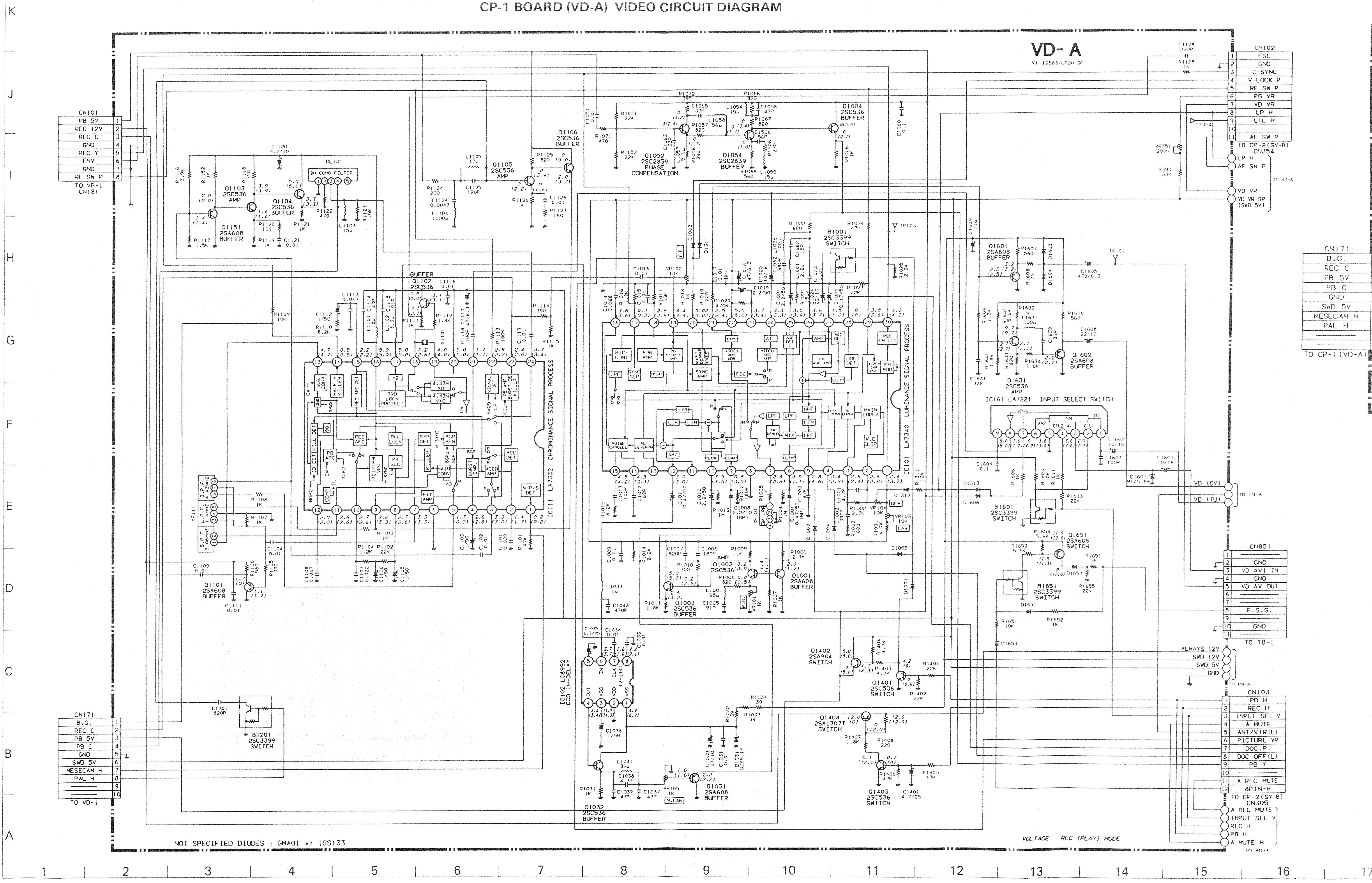
PW-1 BOARD POWER SUPPLY CIRCUIT DIAGRAM


PW-1
P1-12555/LP2H-E
IC511 STK7576 SWITCHING REGURATOR
OSC
P.W.M
OVER CURRENT DET.
OVER CURRENT DET.
P.W.M
SUB
13.0
13.1
5.8
6.1
6.0
0
0
13.1
0
8.1
33.7
IC512
SI-3120C
12V REGURATOR
GND
ON/OFF
VOUT
VS
VIN
0
12.2
13.0
AC IN
CN501
BL
BR
L5001
F5001
T400mA
250V
T5001
C5101
0.82/63
D5101
DBF40E
C5102 2200/50
C5105
47/63
F5101
T315mA
250V
D5103
1SS244
C5106
22/63
D5102
1SS244
L5110
L5102
200μH
L5101
200μH
R5102
2.2K 1/2W
R5104
0.33 1W
R5103
0.22 1W
L5103
10μ
C5112
22/35
C5109
1000/10
C5108
470/16
D5110
GZB16C
D5111
GZB10C
C5110
470/16
C5111
1000/10
C5115
100/16
C5113
0.1/25
CN511
1 ALWAYS 13V(MH)
2 GND(MH)
3 ALWAYS 13V(MC)
4 GND(MC)
5 ALWAYS -55V
6 AC 4V
7 AC 4V
8 ALWAYS 55V
9 ALWAYS 5.8V
10 GND
11 ALWAYS 12V
12 GND
TO CP-1(PW-A)
CN541
JW514
VOLTAGE : STOP MODE

PW-1 P.C.B.

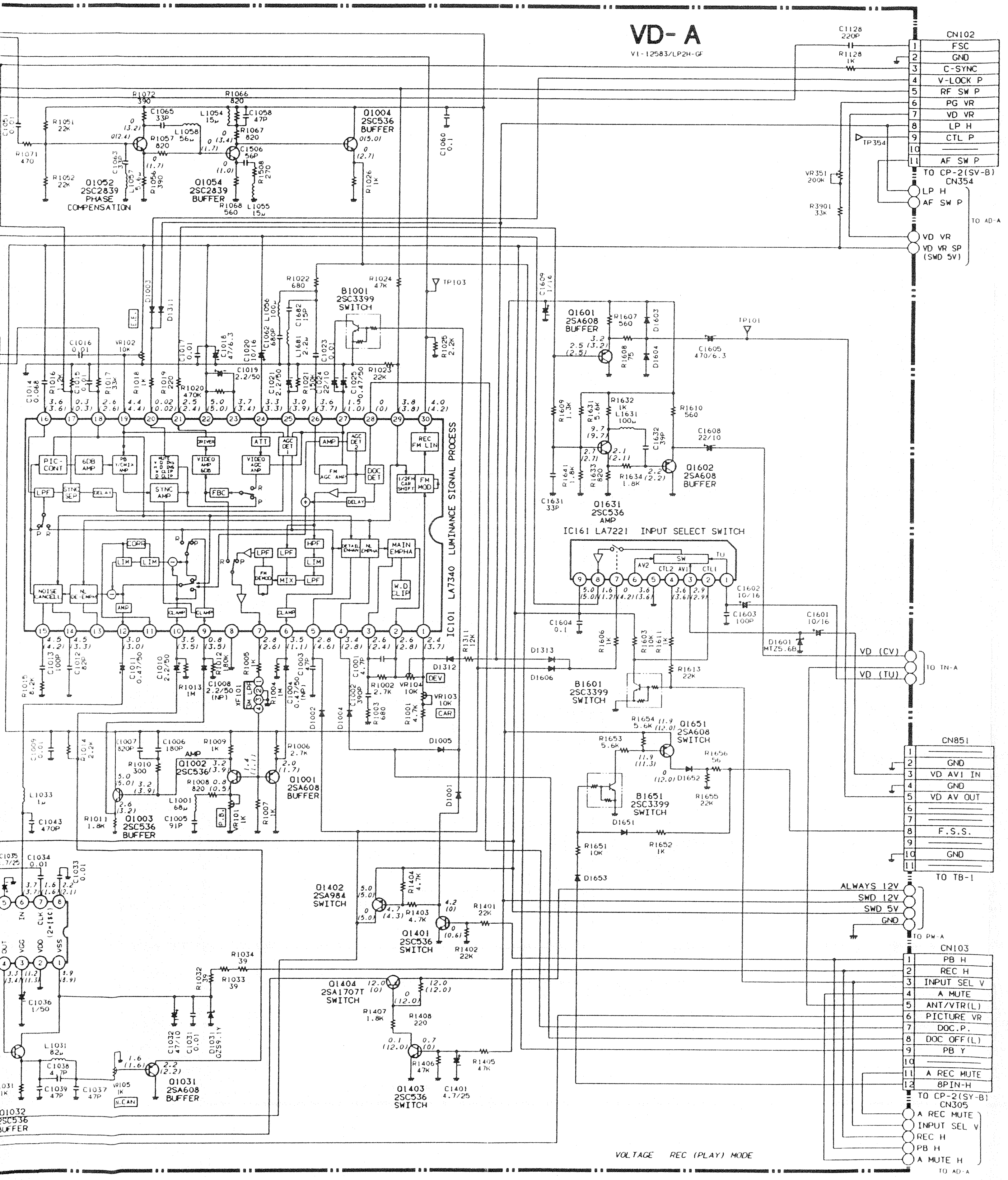

PW-1 1AC4B11A21900D
F5001 T400mA 250V
CN501
C5001
J5002
J5001
L5001
@ JCI-N1S
T5001
R5101
J5101
D5104
D5105
D5107
D5106
D5102
J5103
D5102
D5121
C5105
C5107
D5103
F5101 T315mA 250V
D5110
D5111
C5106
C5102
D5101
C5101
IC512
J5114
J5115
CN511
C5113
C5115
J5110
R5112
C5116
J5120
L5103
JW514
J5109
C5108
C5109
R5104
C5110
R5102
R5103
L5110
L5102
J5106
IC511
J5108
C5112

CP-1 BOARD (VD-A) VIDEO CIRCUIT DIAGRAM

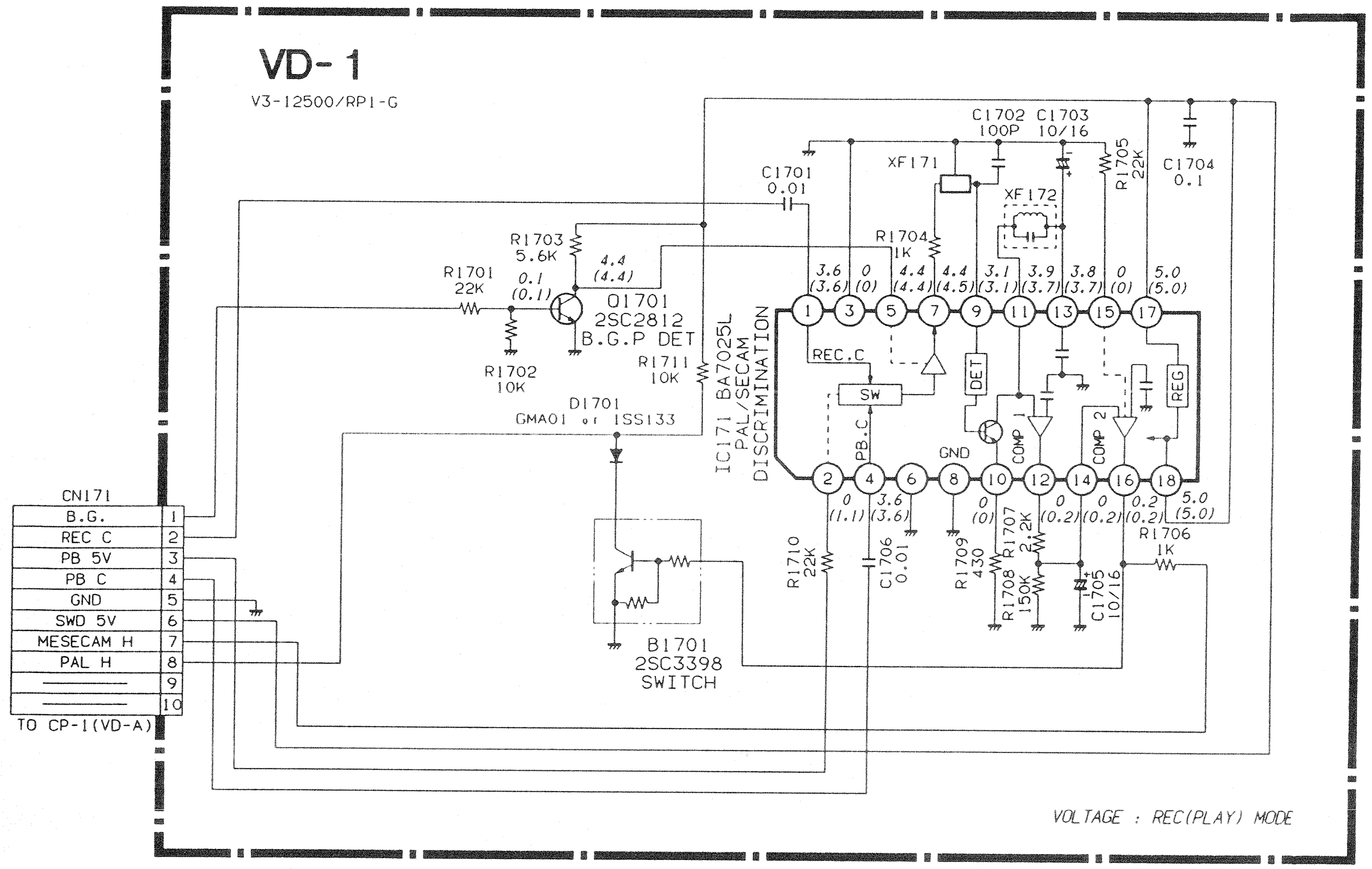


VD- A
VI-12583/LP2H-GF
CN101
PB 5V
REC 12V
REC C
GND
REC Y
ENV
GND
RF SW P
TO VP-1 CN181
CN102
FSC
GND
C-SYNC
V-LOCK P
RF SW P
PG VR
VD VR
LP H
CTL P
AF SW P
TO CP-2(SV-B) CN354
LP H
AF SW P
VD VR
VD VR SP (SWD 5V)
TO AD-A
CN171
B.G.
REC C
PB 5V
PB C
GND
SWD 5V
MESECAM H
PAL H
TO CP-1(VD-A)
TO VD-1
IC111 LA7332 CHROMINANCE SIGNAL PROCESS
IC101 LA7340 LUMINANCE SIGNAL PROCESS
IC161 LA7221 INPUT SELECT SWITCH
IC102 LC8992 CCD 1H-DELAY
DL131 2H COMB FILTER
Q1103 2SC536 AMP
Q1104 2SC536 BUFFER
Q1151 2SA608 BUFFER
Q1105 2SC536 AMP
Q1106 2SC536 BUFFER
Q1052 2SC2839 PHASE COMPENSATION
Q1054 2SC2839 BUFFER
Q1004 2SC536 BUFFER
Q1102 2SC536 BUFFER
B1001 2SC3399 SWITCH
Q1601 2SA608 BUFFER
Q1631 2SC536 AMP
Q1602 2SA608 BUFFER
B1601 2SC3399 SWITCH
Q1651 2SA608 SWITCH
B1651 2SC3399 SWITCH
Q1101 2SA608 BUFFER
Q1002 2SC536 AMP
Q1001 2SA608 BUFFER
Q1003 2SC536 BUFFER
Q1402 2SA984 SWITCH
Q1401 2SC536 SWITCH
Q1404 2SA1707T SWITCH
Q1403 2SC536 SWITCH
Q1031 2SA608 BUFFER
Q1032 2SC536 BUFFER
B1201 2SC3399 SWITCH
VD (CV)
VD (TU)
TO TN-A
CN851
GND
VD AV1 IN
GND
VD AV OUT
F.S.S.
GND
TO TB-1
ALWAYS 12V
SWD 12V
SWD 5V
GND
TO PW-A
CN103
PB H
REC H
INPUT SEL V
A MUTE
ANT/VTR(L)
PICTURE VR
DOC.P.
DOC OFF(L)
PB Y
A REC MUTE
8PIN-H
TO CP-2(SV-B) CN305
A REC MUTE
INPUT SEL V
REC H
PB H
A MUTE H
TO AD-A
NOT SPECIFIED DIODES : GMA01 or 1SS133
VOLTAGE REC (PLAY) MODE
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

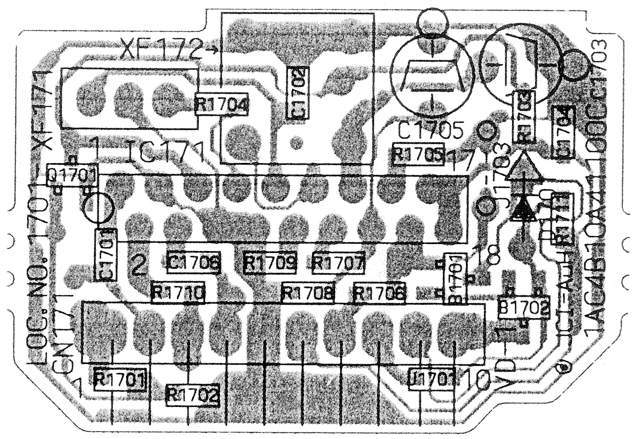
D-A) VIDEO CIRCUIT DIAGRAM


VD- A
V1-12583/LP2H-GF
CN102
1 FSC
2 GND
3 C-SYNC
4 V-LOCK P
5 RF SW P
6 PG VR
7 VD VR
8 LP H
9 CTL P
10
11 AF SW P
TO CP-2(SV-B) CN354
LP H
AF SW P
VD VR
VD VR SP (SWD 5V)
TO AD-A
Q1052 2SC2839 PHASE COMPENSATION
Q1054 2SC2839 BUFFER
Q1004 2SC536 BUFFER
B1001 2SC3399 SWITCH
Q1601 2SA608 BUFFER
Q1602 2SA608 BUFFER
Q1631 2SC536 AMP
IC161 LA7221 INPUT SELECT SWITCH
IC101 LA7340 LUMINANCE SIGNAL PROCESS
B1601 2SC3399 SWITCH
Q1651 2SA608 SWITCH
B1651 2SC3399 SWITCH
Q1002 2SC536 AMP
Q1001 2SA608 BUFFER
Q1003 2SC536 BUFFER
Q1402 2SA984 SWITCH
Q1401 2SC536 SWITCH
Q1404 2SA1707T SWITCH
Q1403 2SC536 SWITCH
Q1031 2SA608 BUFFER
Q1032 2SC536 BUFFER
VD (CV)
VD (TU)
TO TN-A
CN851
1
2 GND
3 VD AV1 IN
4 GND
5 VD AV OUT
6
7
8 F.S.S.
9
10 GND
11
TO TB-1
ALWAYS 12V
SWD 12V
SWD 5V
GND
TO PW-A
CN103
1 PB H
2 REC H
3 INPUT SEL V
4 A MUTE
5 ANT/VTR(L)
6 PICTURE VR
7 DOC.P.
8 DOC OFF(L)
9 PB Y
10
11 A REC MUTE
12 8PIN-H
TO CP-2(SY-B) CN305
A REC MUTE
INPUT SEL V
REC H
PB H
A MUTE H
TO AD-A
VOLTAGE REC (PLAY) MODE

VD-1 BOARD PAL/SECAM DISCRIMINATION CIRCUIT DIAGRAM


VD- 1
V3-12500/RP1-G
C1702 100P
C1703 10/16
XF171
XF172
R1705 22K
C1704 0.1
C1701 0.01
R1703 5.6K
R1704 1K
R1701 22K
Q1701 2SC2812 B.G.P DET
R1702 10K
R1711 10K
D1701 GMA01 or 1SS133
IC171 BA7025L PAL/SECAM DISCRIMINATION
REC.C
SW
PB.C
DET
COMP
COMP 2
REG
GND
R1710 22K
C1706 0.01
R1709 430
R1707 2.2K
R1708 150K
C1705 10/16
R1706 1K
B1701 2SC3398 SWITCH
CN171
1 B.G.
2 REC C
3 PB 5V
4 PB C
5 GND
6 SWD 5V
7 MESECAM H
8 PAL H
9
10
TO CP-1(VD-A)
VOLTAGE : REC(PLAY) MODE

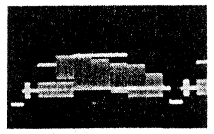
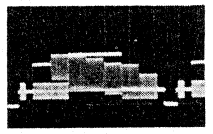
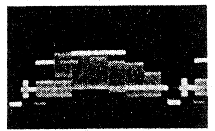
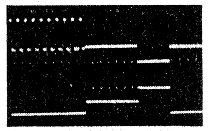
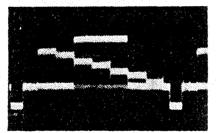
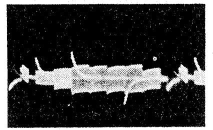
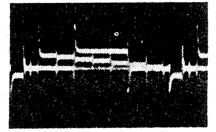
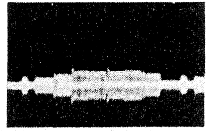
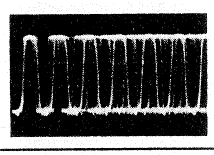
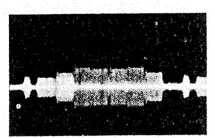
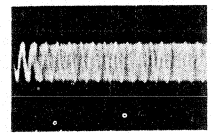
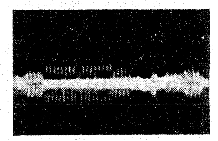
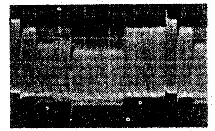
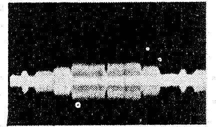
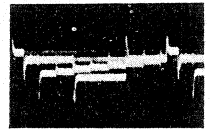
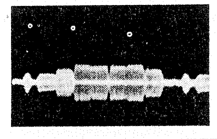
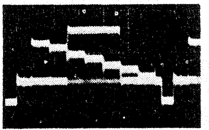
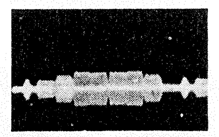
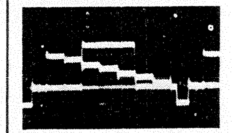
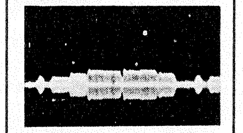
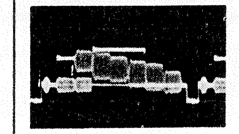
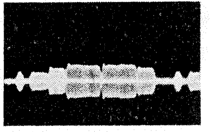
VD-1 P.C.B.


XF172
XF171
R1704
C1702
C1705
R1705
IC171
Q1701
R1703
C1704
C1703
C1701
C1706
R1709
R1707
R1710
R1708
R1706
R1711
B1701
B1702
R1701
R1702
J1701
CN171
LOC.NO.1701
IC1-AJ
VD

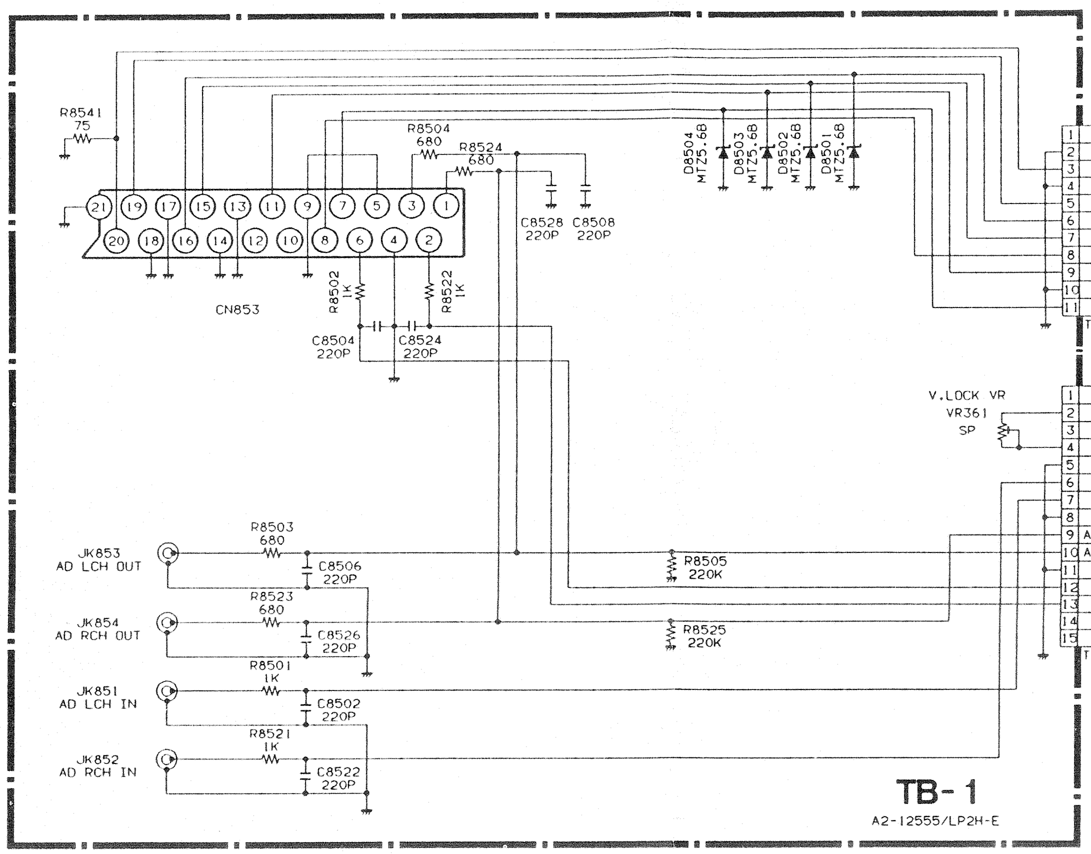
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

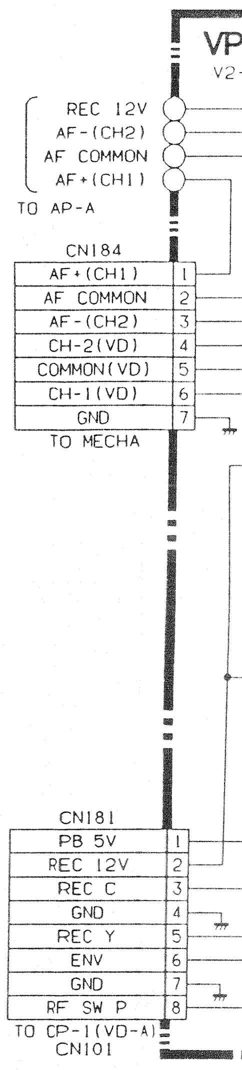
WAVEFORM OF VIDEO

WF-V5

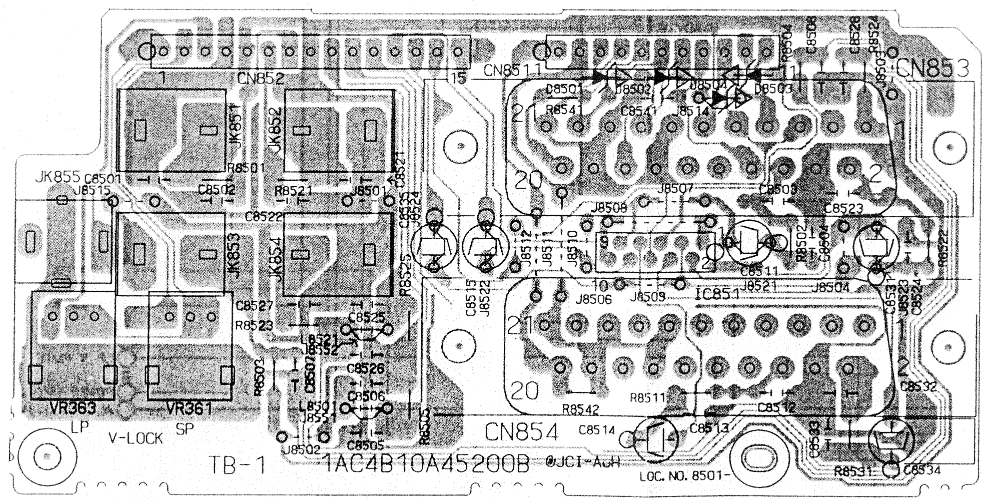
TEST LOCATION	WAVEFORM	MODE/LEVEL	TEST LOCATION	WAVEFORM	MODE/LEVEL
IC101 Pin 24		REC, EE 1 Vp-p	IC101 Pin 21		REC, EE 2 Vp-p
IC101 Pin 7		REC, EE 1 Vp-p	IC101 (UPPER) Pin 21 (LOWER) Pin 20		STILL (UPPER) 2 Vp-p (LOWER) 5 Vp-p
IC101 Pin 6		REC, EE 0.45 Vp-p	IC111 Pin 21		REC, EE 1 Vp-p
IC101 Pin 2		REC, EE 1.3 Vp-p	IC111 Pin 3		REC, EE 0.14 Vp-p
IC101 Pin 30		REC, EE 1.5 Vp-p	IC111 Pin 9		REC, EE 0.8Vp-p
IC101 Pin 26		PB 0.3 Vp-p	Q1105 Base		PB 0.1 Vp-p
IC101 Pin 7		PB 2.0 Vp-p	Q1106 Emitter		PB 0.8 Vp-p
Q1002 Base		PB 0.5 Vp-p	IC111 Pin 7		PB 0.3 Vp-p
IC101 Pin 9		PB 0.6 Vp-p	IC111 Pin 5		PB 1.2 Vp-p
IC101 Pins 10/12		PB 0.5 Vp-p	IC111 Pin 24		PB 0.24 Vp-p
IC101 Pin 21		PB 2 Vp-p	IC111 Pin 23		PB 0.7 Vp-p

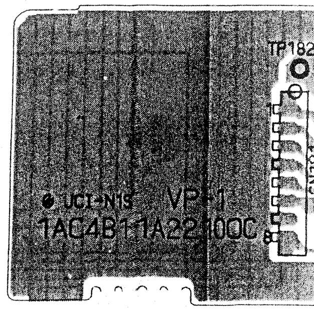
TB-1 BOARD TERMINAL CIRCUIT DIAGRAM


R8541
75
R8504
680
R8524
680
D8504 MTZ5.6B
D8503 MTZ5.6B
D8502 MTZ5.6B
D8501 MTZ5.6B
C8528 C8508
220P 220P
CN853
R8502 1K
R8522 1K
C8504 220P
C8524 220P
CN851
1
2 GND
3 VD AV1 IN
4 GND
5 VD AV OUT
6
7
8 F.S.S.
9
10 GND
11
TO CP-1(VD-A)
V.LOCK VR
VR361
SP
CN852
1
2 SP(V-LOCK)
3
4 COM(V-LOCK)
5 GND
6 AD RCA-R IN
7 AD RCA-L IN
8 GND
9 AD LINE-R OUT
10 AD LINE-L OUT
11 GND
12 AD AV L IN
13 AD AV R IN
14
15
TO CP-1(AD-A)
JK853
AD LCH OUT
R8503
680
C8506
220P
JK854
AD RCH OUT
R8523
680
C8526
220P
R8501
1K
JK851
AD LCH IN
C8502
220P
R8521
1K
JK852
AD RCH IN
C8522
220P
R8505
220K
R8525
220K
TB-1
A2-12555/LP2H-E


VP
V2-
REC 12V
AF-(CH2)
AF COMMON
AF+(CH1)
TO AP-A
CN184
AF+(CH1) 1
AF COMMON 2
AF-(CH2) 3
CH-2(VD) 4
COMMON(VD) 5
CH-1(VD) 6
GND 7
TO MECHA
CN181
PB 5V 1
REC 12V 2
REC C 3
GND 4
REC Y 5
ENV 6
GND 7
RF SW P 8
TO CP-1(VD-A)
CN101

TB-1 P.C.B.

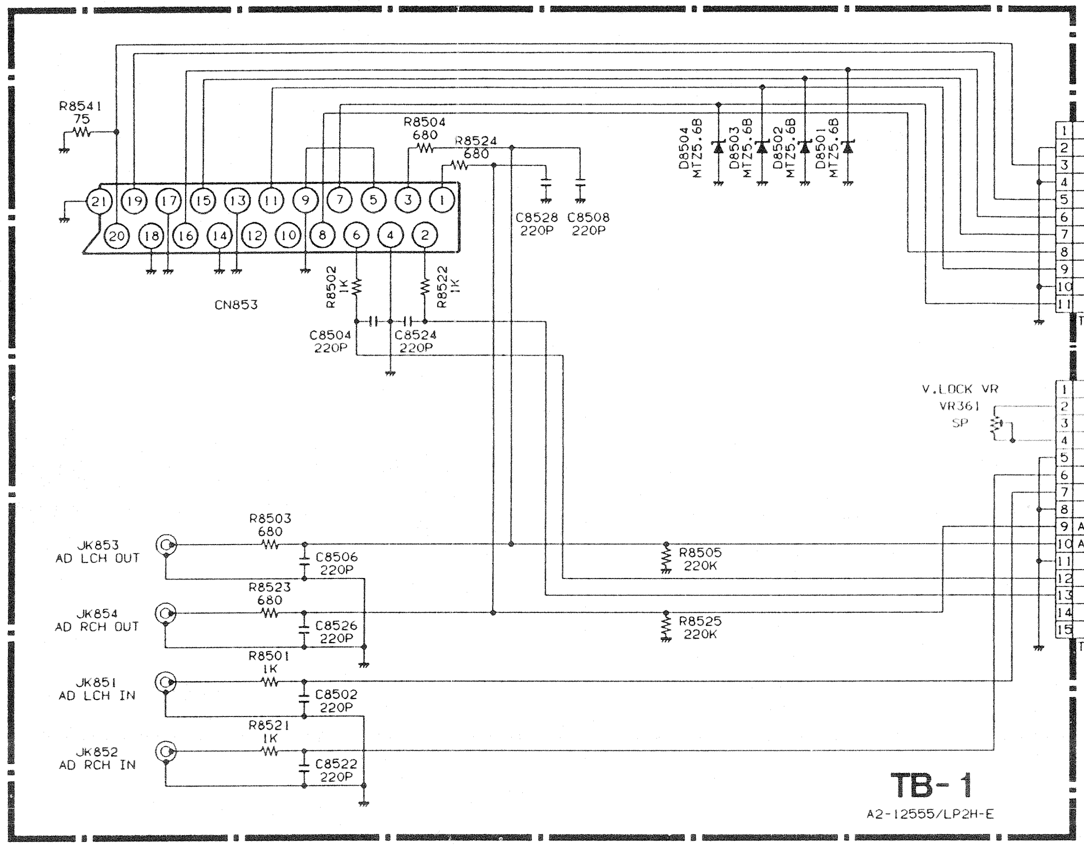

CN852
CN851
CN853
JK851
JK852
JK853
JK854
JK855
IC851
CN854
VR363
VR361
LP
V-LOCK
SP
TB-1
1AC4B10A45200B
JCI-AUH
LOC. NO. 8501-


TP182
JCI-N1S
VP-1
1AC4B11A22100C

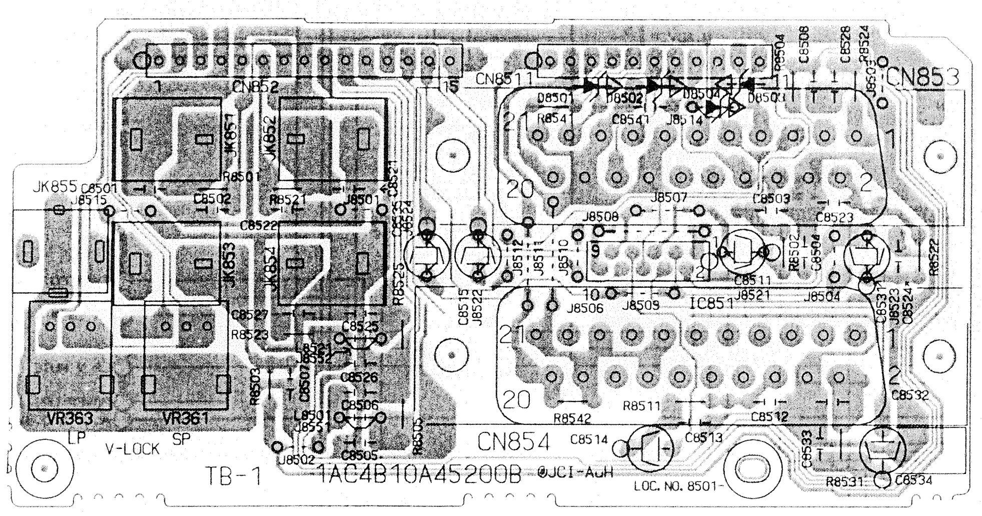
WF-V5

MODE/LEVEL
REC, EE 2 Vp-p
STILL (UPPER) 2 Vp-p (LOWER) 5 Vp-p
REC, EE 1 Vp-p
REC, EE 0.14 Vp-p
REC, EE 0.8Vp-p
PB 0.1 Vp-p
PB 0.8 Vp-p
PB 0.3 Vp-p
PB 1.2 Vp-p
PB 0.24 Vp-p
PB 0.7 Vp-p

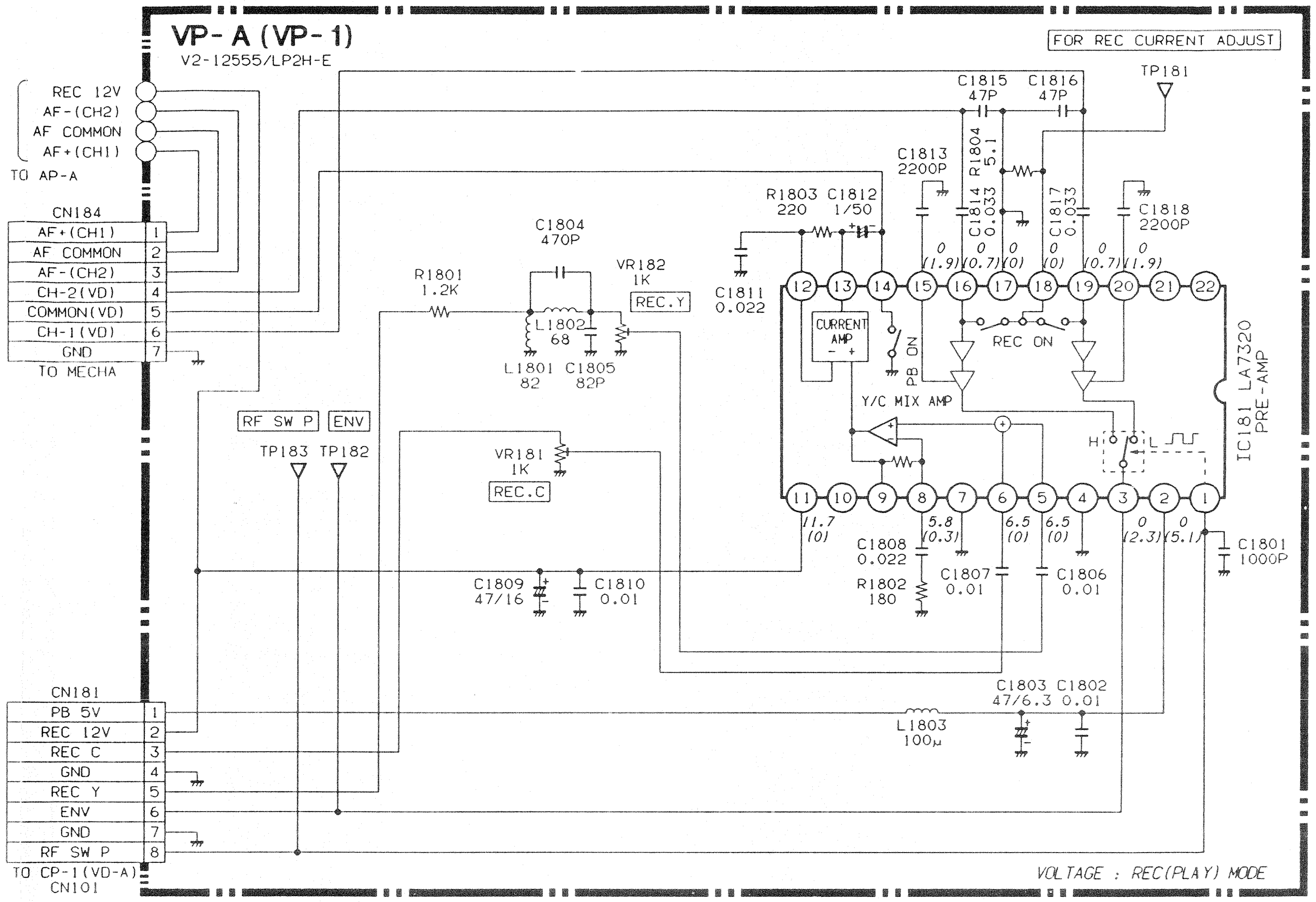
TB-1 BOARD TERMINAL CIRCUIT DIAGRAM


TB-1
A2-12555/LP2H-E
CN853
CN851
GND
VD AV1 IN
GND
VD AV OUT
F.S.S.
GND
TO CP-1(VD-A)
CN852
SP(V-LOCK)
COM(V-LOCK)
GND
AD RCA-R IN
AD RCA-L IN
GND
AD LINE-R OUT
AD LINE-L OUT
GND
AD AV L IN
AD AV R IN
TO CP-1(AD-A)
V.LOCK VR
VR361
SP
R8541 75
R8504 680
R8524 680
C8528 220P
C8508 220P
D8504 MTZ5.6B
D8503 MTZ5.6B
D8502 MTZ5.6B
D8501 MTZ5.6B
R8502 1K
R8522 1K
C8504 220P
C8524 220P
JK853 AD LCH OUT
R8503 680
C8506 220P
R8505 220K
JK854 AD RCH OUT
R8523 680
C8526 220P
R8525 220K
JK851 AD LCH IN
R8501 1K
C8502 220P
JK852 AD RCH IN
R8521 1K
C8522 220P

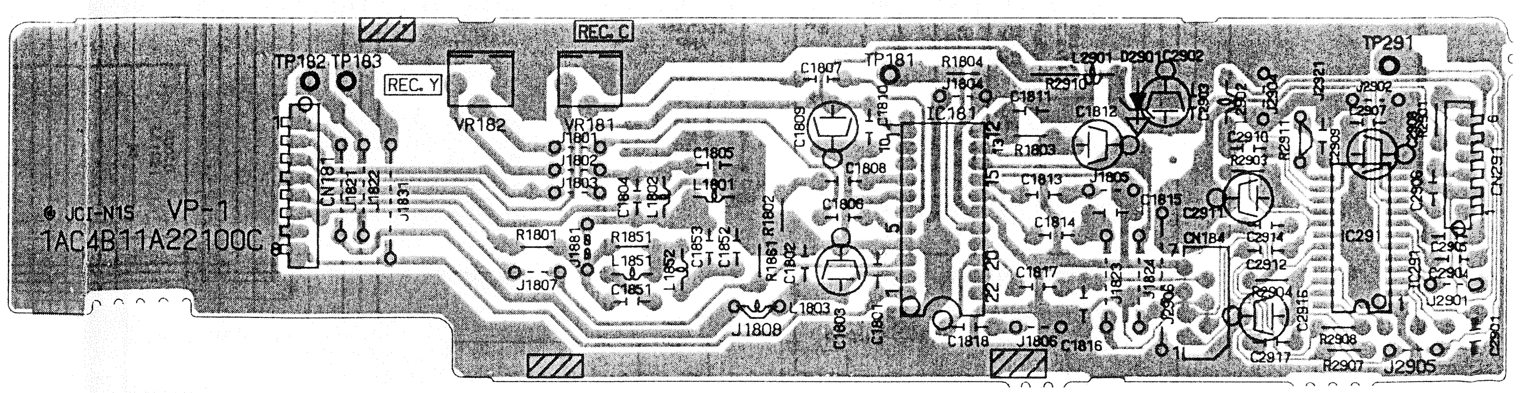
TB-1 P.C.B.


CN852
CN851
CN853
CN854
JK855
JK851
JK852
JK853
VR363
VR361
LP
SP
V-LOCK
IC851
TB-1
1AC4B10A45200B
JCI-AuH
LOC. NO. 8501

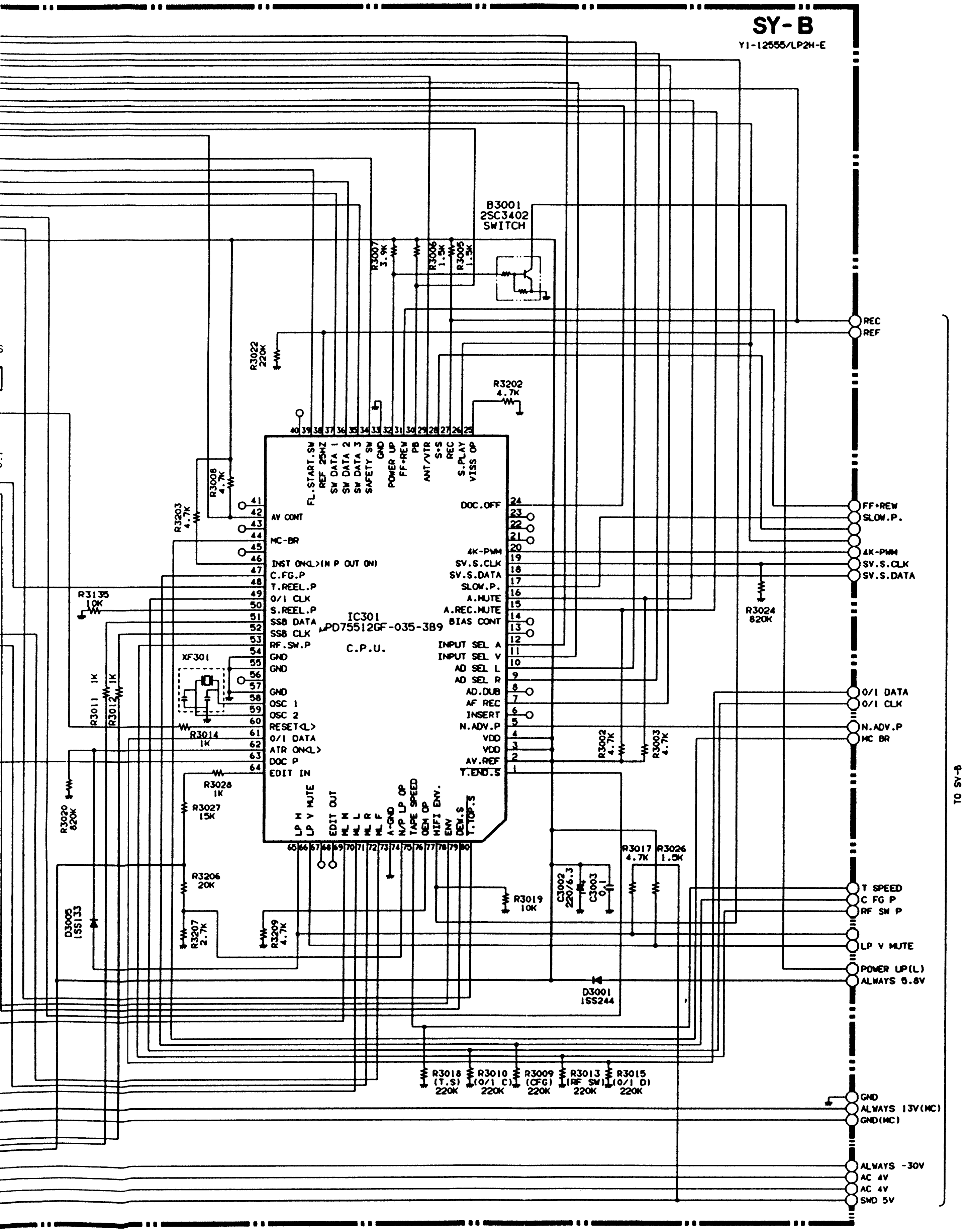
VP-1 BOARD (VP-A) VIDEO PRE-AMP CIRCUIT DIAGRAM


VP-A (VP-1)
V2-12555/LP2H-E
FOR REC CURRENT ADJUST
REC 12V
AF-(CH2)
AF COMMON
AF+(CH1)
TO AP-A
CN184
AF+(CH1)
AF COMMON
AF-(CH2)
CH-2(VD)
COMMON(VD)
CH-1(VD)
GND
TO MECHA
RF SW P
ENV
TP183
TP182
TP181
C1815 47P
C1816 47P
C1813 2200P
R1804 5.1
C1814 0.033
C1817 0.033
C1818 2200P
R1803 220
C1812 1/50
C1804 470P
VR182 1K
REC.Y
R1801 1.2K
L1802 68
L1801 82
C1805 82P
C1811 0.022
CURRENT AMP
PB ON
REC ON
Y/C MIX AMP
IC181 LA7320 PRE-AMP
VR181 1K
REC.C
C1808 0.022
R1802 180
C1807 0.01
C1806 0.01
C1801 1000P
C1809 47/16
C1810 0.01
C1803 47/6.3
C1802 0.01
L1803 100μ
CN181
PB 5V
REC 12V
REC C
GND
REC Y
ENV
GND
RF SW P
TO CP-1(VD-A) CN101
VOLTAGE : REC(PLAY) MODE

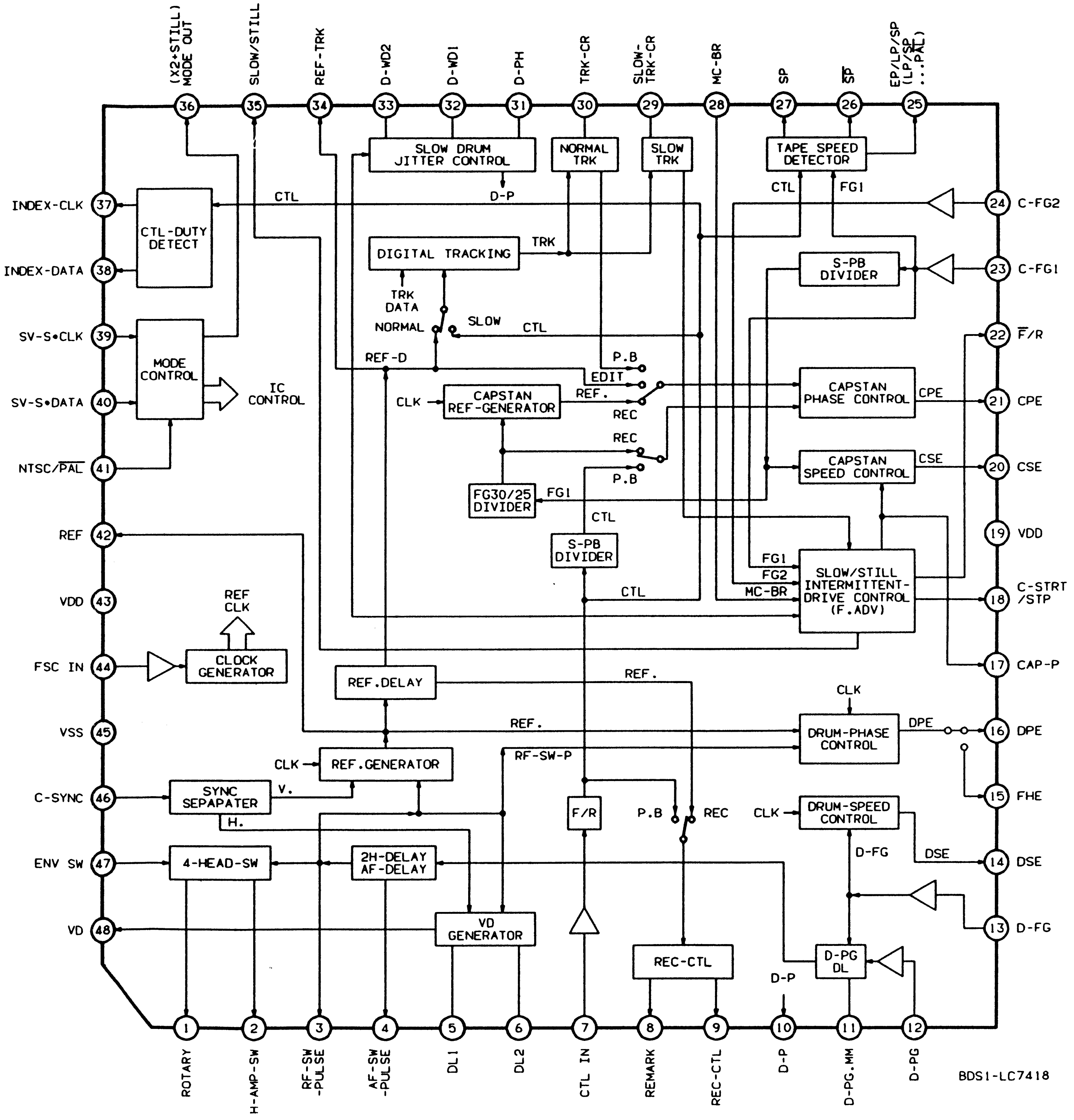
VP-1 P.C.B.


REC. C
REC. Y
TP182
TP183
TP181
TP291
VR182
VR181
IC181
IC291
CN181
CN184
CN291
JCI-N1S VP-1
1AC4B11A22100C

CONTROL CIRCUIT DIAGRAM

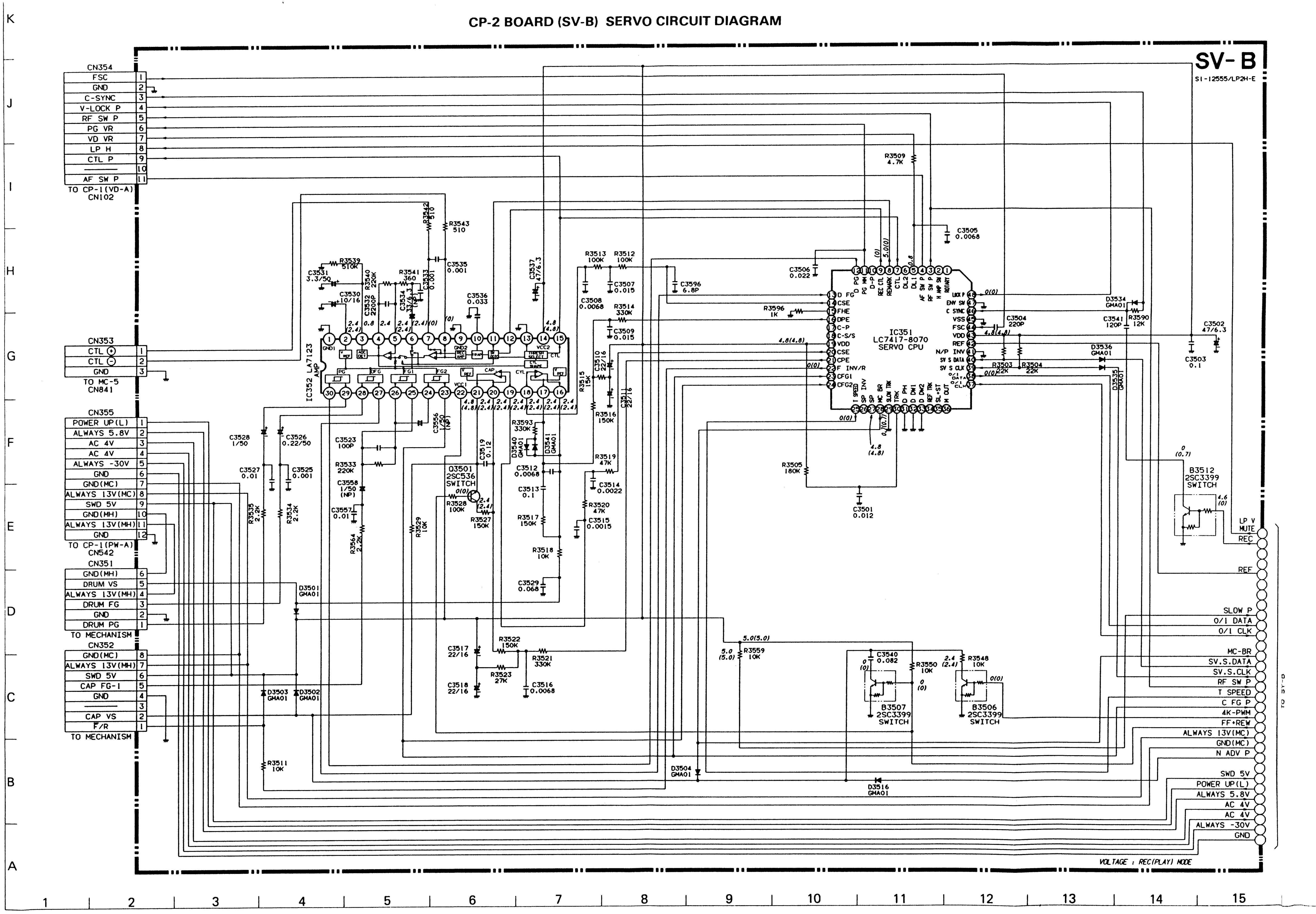

SY-B
YI-12555/LP2H-E
B3001
2SC3402
SWITCH
R3007 3.9K
R3006 1.5K
R3005 1.5K
R3022 220K
R3202 4.7K
R3008 4.7K
R3203 4.7K
R3135 10K
R3024 820K
IC301
μPD75512GF-035-3B9
C.P.U.
FL.START.SW
REF 25HZ
SW DATA 1
SW DATA 2
SW DATA 3
SAFETY SW
GND
POWER UP
FF•REW
PB
ANT/VTR
S-S
REC
S.PLAY
VISS OP
DOC.OFF
4K-PWM
SV.S.CLK
SV.S.DATA
SLOW.P.
A.MUTE
A.REC.MUTE
BIAS CONT
INPUT SEL A
INPUT SEL V
AD SEL L
AD SEL R
AD.DUB
AF REC
INSERT
N.ADV.P
VDD
VDD
AV.REF
T.END.S
AV CONT
MC-BR
INST ON(L)(IN P OUT ON)
C.FG.P
T.REEL.P
O/I CLK
S.REEL.P
SSB DATA
SSB CLK
RF.SW.P
GND
GND
GND
OSC 1
OSC 2
RESET(L)
O/I DATA
ATR ON(L)
DOC P
EDIT IN
LP H
LP V MUTE
EDIT OUT
ML H
ML L
ML R
ML F
A-GND
N/P LP OP
TAPE SPEED
DEH OP
HIFI ENV.
ENV
DEV.S
T.TOP.S
XF301
R3011 1K
R3012 1K
R3014 1K
R3028 1K
R3027 15K
R3020 820K
R3206 20K
D3005 1SS133
R3207 2.7K
R3209 4.7K
R3002 4.7K
R3003 4.7K
R3017 4.7K
R3026 1.5K
R3019 10K
C3002 220/6.3
C3003 0.1
D3001 1SS244
R3018 (T.S) 220K
R3010 (O/I C) 220K
R3009 (CFG) 220K
R3013 (RF SW) 220K
R3015 (O/I D) 220K
REC
REF
FF•REW
SLOW.P.
4K-PWM
SV.S.CLK
SV.S.DATA
O/I DATA
O/I CLK
N.ADV.P
MC BR
T SPEED
C FG P
RF SW P
LP V MUTE
POWER UP(L)
ALWAYS 5.6V
GND
ALWAYS 13V(MC)
GND(MC)
ALWAYS -30V
AC 4V
AC 4V
SWD 5V
TO SY-B

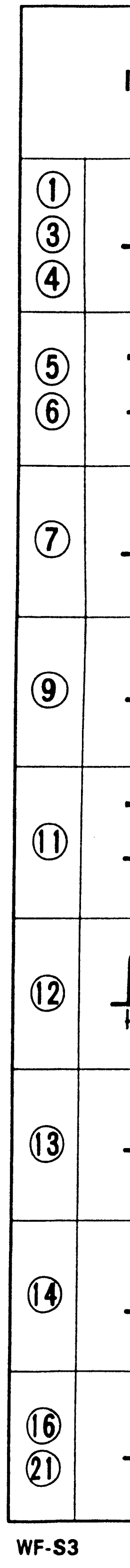
IC351 (LC7417) DIGITAL SERVO IC INTER BLOCK DIAGRAM


(X2+STILL) MODE OUT
SLOW/STILL
REF-TRK
D-WD2
D-WD1
D-PH
TRK-CR
SLOW-TRK-CR
MC-BR
SP
SP
EP/LP/SP (LP/SP ..PAL)
36
35
34
33
32
31
30
29
28
27
26
25
SLOW DRUM JITTER CONTROL
D-P
NORMAL TRK
SLOW TRK
TAPE SPEED DETECTOR
CTL
FG1
INDEX-CLK
37
INDEX-DATA
38
SV-S•CLK
39
SV-S•DATA
40
NTSC/PAL
41
REF
42
VDD
43
FSC IN
44
VSS
45
C-SYNC
46
ENV SW
47
VD
48
CTL-DUTY DETECT
CTL
DIGITAL TRACKING
TRK
TRK DATA
NORMAL
SLOW
CTL
MODE CONTROL
IC CONTROL
REF-D
P.B
EDIT
CLK
CAPSTAN REF-GENERATOR
REF.
REC
REC
P.B
FG30/25 DIVIDER
FG1
CTL
S-PB DIVIDER
CTL
S-PB DIVIDER
CAPSTAN PHASE CONTROL
CPE
CAPSTAN SPEED CONTROL
CSE
FG1
FG2
MC-BR
SLOW/STILL INTERMITTENT-DRIVE CONTROL (F.ADV)
REF CLK
CLOCK GENERATOR
REF.DELAY
REF.
REF.
CLK
REF.GENERATOR
RF-SW-P
SYNC SEPAPATER
V.
H.
DRUM-PHASE CONTROL
DPE
CLK
F/R
P.B
REC
CLK
DRUM-SPEED CONTROL
D-FG
DSE
4-HEAD-SW
2H-DELAY AF-DELAY
VD GENERATOR
REC-CTL
D-P
D-PG DL
24
C-FG2
23
C-FG1
22
F/R
21
CPE
20
CSE
19
VDD
18
C-STRT /STP
17
CAP-P
16
DPE
15
FHE
14
DSE
13
D-FG
1
2
3
4
5
6
7
8
9
10
11
12
ROTARY
H-AMP-SW
RF-SW -PULSE
AF-SW -PULSE
DL1
DL2
CTL IN
REMARK
REC-CTL
D-P
D-PG.MM
D-PG
BDS1-LC7418

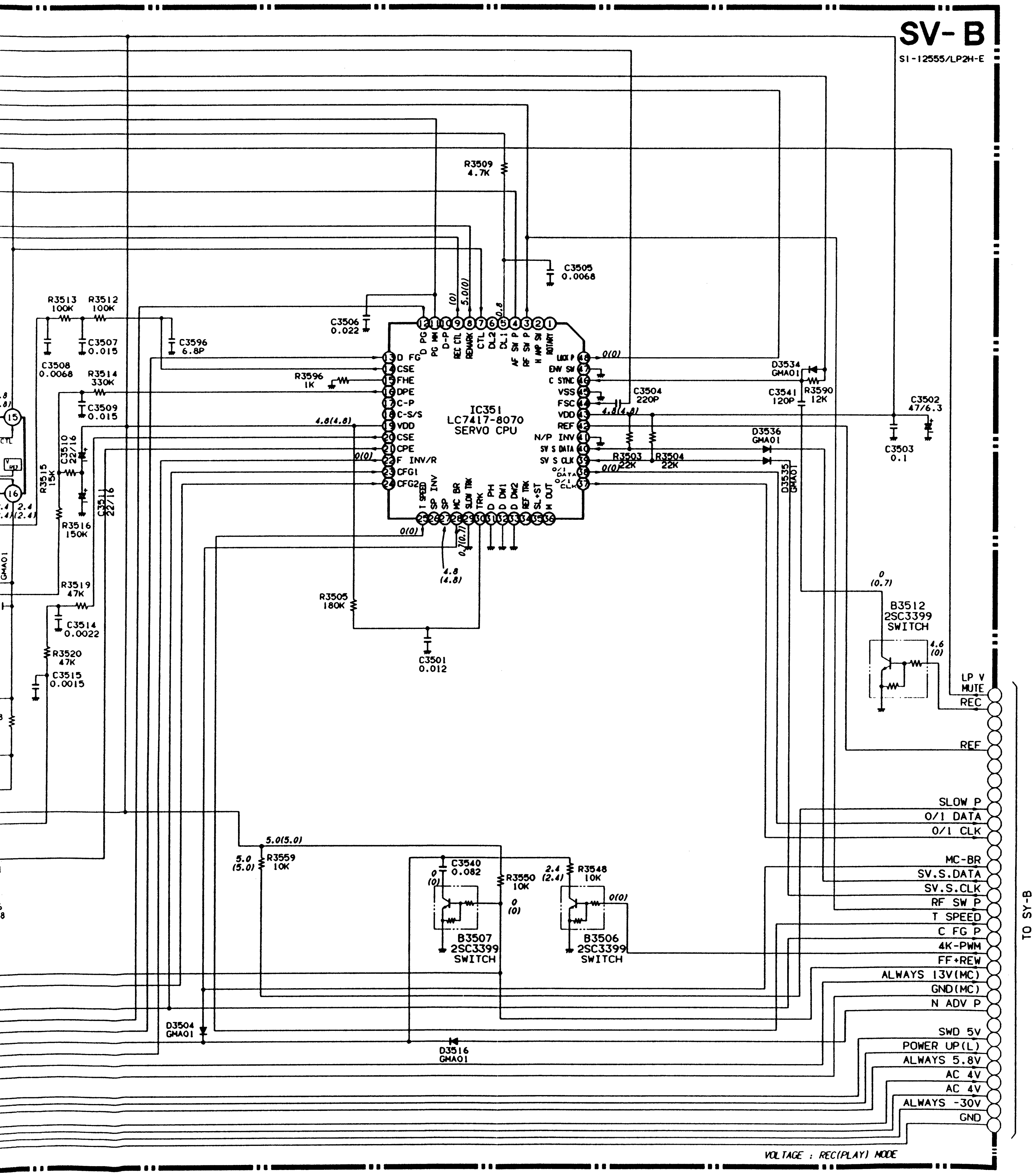
8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24

CP-2 BOARD (SV-B) SERVO CIRCUIT DIAGRAM

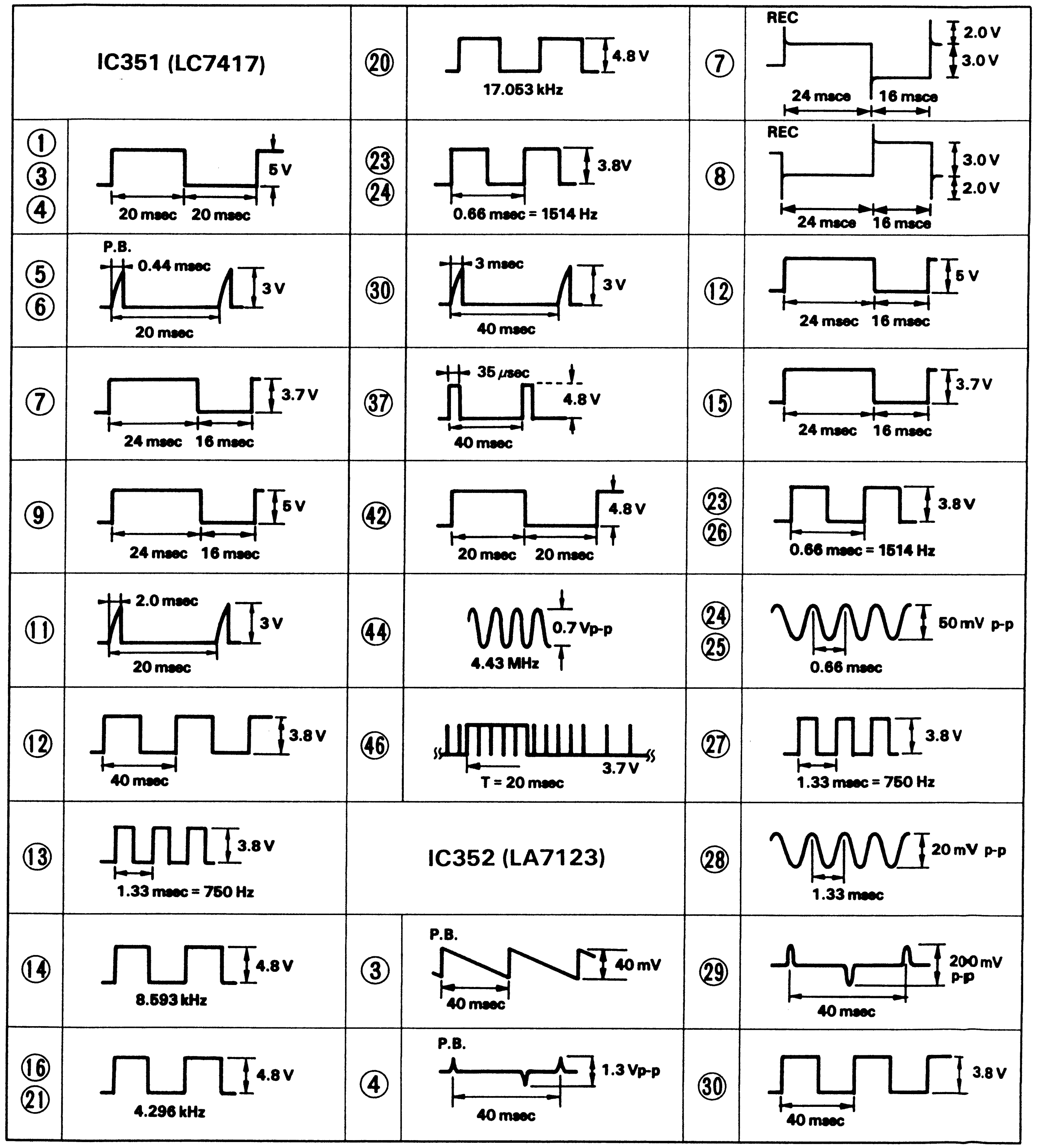

SV-B
SI-12555/LP2H-E
CN354
FSC
GND
C-SYNC
V-LOCK P
RF SW P
PG VR
VD VR
LP H
CTL P
AF SW P
TO CP-1(VD-A) CN102
CN353
CTL ⊕
CTL ⊖
GND
TO MC-5 CN841
CN355
POWER UP(L)
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
GND
GND(MC)
ALWAYS 13V(MC)
SWD 5V
GND(MH)
ALWAYS 13V(MH)
GND
TO CP-1(PW-A) CN542
CN351
GND(MH)
DRUM VS
ALWAYS 13V(MH)
DRUM FG
GND
DRUM PG
TO MECHANISM
CN352
GND(MC)
ALWAYS 13V(MH)
SWD 5V
CAP FG-1
GND
CAP VS
F/R
TO MECHANISM
IC352 LA7123 AMP
IC351 LC7417-8070 SERVO CPU
Q3501 2SC536 SWITCH
B3507 2SC3399 SWITCH
B3506 2SC3399 SWITCH
B3512 2SC3399 SWITCH
R3543 510
R3542 510
R3539 510K
R3540 220K
R3541 360
C3531 3.3/50
C3530 10/16
C3532 2200P
C3534 1/50
C3533 0.001
C3535 0.001
C3536 0.033
C3537 47/6.3
R3513 100K
R3512 100K
C3507 0.015
C3508 0.0068
R3514 330K
C3509 0.015
C3596 6.8P
R3596 1K
C3506 0.022
R3509 4.7K
C3505 0.0068
C3504 220P
C3541 120P
R3590 12K
D3534 GMA01
D3536 GMA01
D3535 GMA01
C3502 47/6.3
C3503 0.1
R3503 22K
R3504 22K
C3528 1/50
C3526 0.22/50
C3527 0.01
C3525 0.001
C3523 100P
R3533 220K
C3558 1/50 (NP)
C3557 0.01
R3564 2.2K
R3535 2.2K
R3534 2.2K
R3529 10K
C3556 1/50 (NP)
C3519 0.12
R3528 100K
R3527 150K
R3593 330K
D3540 GMA01
D3541 GMA01
C3512 0.0068
C3513 0.1
R3517 150K
R3518 10K
C3529 0.068
R3515 15K
C3510 22/16
C3511 22/16
R3516 150K
R3519 47K
C3514 0.0022
R3520 47K
C3515 0.0015
R3505 180K
C3501 0.012
D3501 GMA01
D3503 GMA01
D3502 GMA01
R3511 10K
C3517 22/16
C3518 22/16
R3522 150K
R3523 27K
R3521 330K
C3516 0.0068
R3559 10K
C3540 0.082
R3550 10K
R3548 10K
D3504 GMA01
D3516 GMA01
LP V MUTE
REC
REF
SLOW P
0/1 DATA
0/1 CLK
MC-BR
SV.S.DATA
SV.S.CLK
RF SW P
T SPEED
C FG P
4K-PWM
FF+REW
ALWAYS 13V(MC)
GND(MC)
N ADV P
SWD 5V
POWER UP(L)
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
GND
TO SY-B
VOLTAGE : REC(PLAY) MODE
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16


①
③
④
⑤
⑥
⑦
⑨
⑪
⑫
⑬
⑭
⑯
㉑
WF-S3

(SV-B) SERVO CIRCUIT DIAGRAM

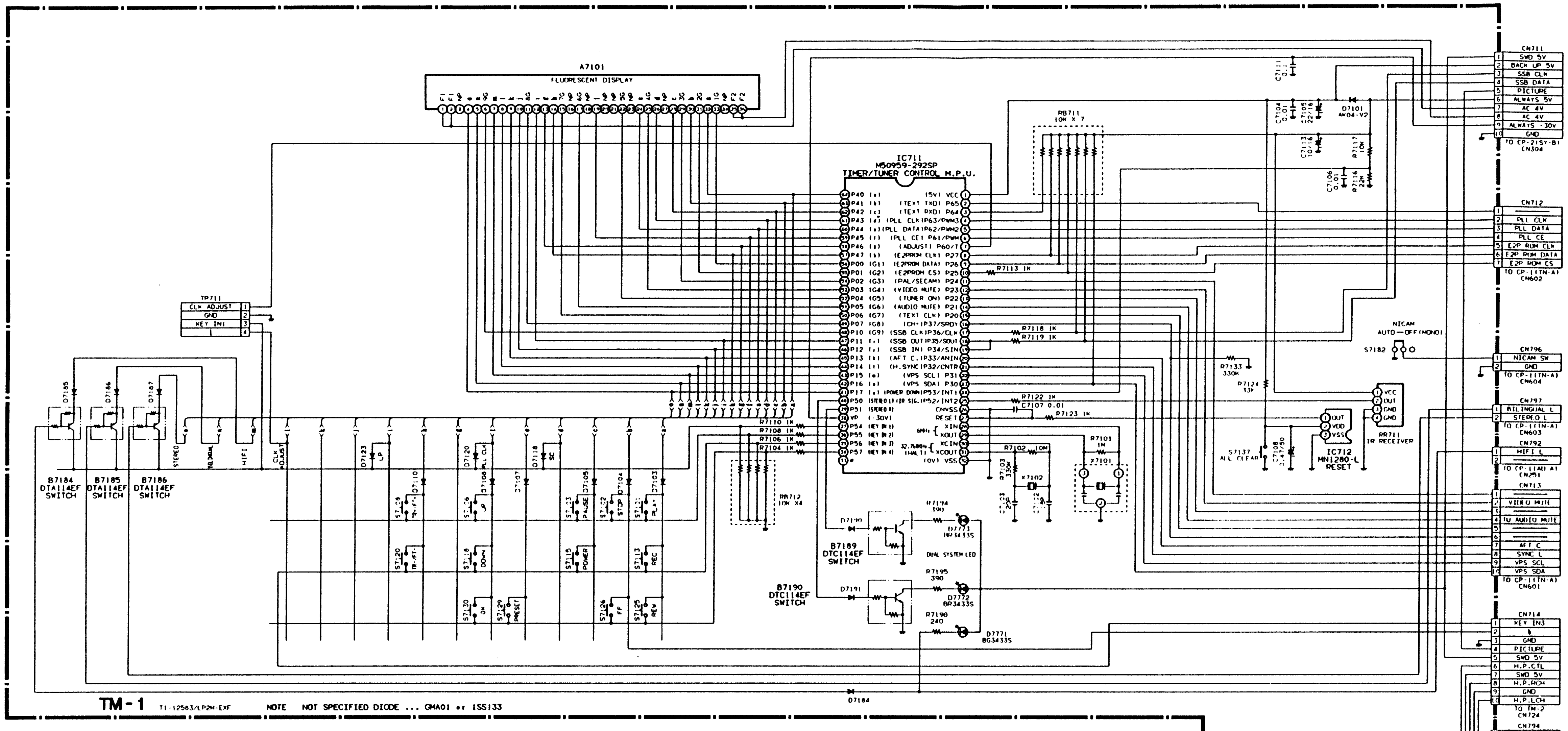

SV-B
SI-12555/LP2H-E
IC351
LC7417-8070
SERVO CPU
D FG
CSE
FHE
DPE
C-P
C-S/S
VDD
CSE
CPE
F INV/R
CFG1
CFG2
D PG
PG MH
D-P
REC CTL
REMARK
CTL
DL2
DL1
AF SW P
RF SW P
H AMP SW
ROTARY
LOCK P
ENV SW
C SYNC
VSS
FSC
VDD
REF
N/P INV
SY S DATA
SY S CLK
0/1 DATA
0/1 CLK
T SPEED
SP INV
SP
MC BR
SLOW TRK
TRK
D PH
D DW1
D DW2
REF TRK
SL+ST
W OUT
R3509 4.7K
C3505 0.0068
C3506 0.022
R3513 100K
R3512 100K
C3507 0.015
C3596 6.8P
C3508 0.0068
R3514 330K
R3596 1K
C3509 0.015
C3510 22/16
R3515 15K
C3511 22/16
R3516 150K
R3519 47K
C3514 0.0022
R3520 47K
C3515 0.0015
D3534 GMA01
C3541 120P
R3590 12K
C3504 220P
C3502 47/6.3
C3503 0.1
D3536 GMA01
R3503 22K
R3504 22K
D3535 GMA01
R3505 180K
C3501 0.012
B3512 2SC3399 SWITCH
R3559 10K
C3540 0.082
R3550 10K
B3507 2SC3399 SWITCH
R3548 10K
B3506 2SC3399 SWITCH
D3504 GMA01
D3516 GMA01
LP V MUTE
REC
REF
SLOW P
0/1 DATA
0/1 CLK
MC-BR
SV.S.DATA
SV.S.CLK
RF SW P
T SPEED
C FG P
4K-PWM
FF+REW
ALWAYS 13V(MC)
GND(MC)
N ADV P
SWD 5V
POWER UP(L)
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
GND
TO SY-B
VOLTAGE : REC(PLAY) MODE

WAVEFORM OF SERVO


IC351 (LC7417)
①③④ 5V 20 msec 20 msec
⑤⑥ P.B. 0.44 msec 3V 20 msec
⑦ 3.7V 24 msec 16 msec
⑨ 5V 24 msec 16 msec
⑪ 2.0 msec 3V 20 msec
⑫ 3.8V 40 msec
⑬ 3.8V 1.33 msec = 750 Hz
⑭ 4.8V 8.593 kHz
⑯㉑ 4.8V 4.296 kHz
⑳ 4.8V 17.053 kHz
㉓㉔ 3.8V 0.66 msec = 1514 Hz
㉚ 3 msec 3V 40 msec
㊲ 35 μsec 4.8V 40 msec
㊷ 4.8V 20 msec 20 msec
㊹ 0.7 Vp-p 4.43 MHz
㊻ 3.7V T = 20 msec
IC352 (LA7123)
③ P.B. 40 mV 40 msec
④ P.B. 1.3 Vp-p 40 msec
⑦ REC 2.0V 3.0V 24 msec 16 msec
⑧ REC 3.0V 2.0V 24 msec 16 msec
⑫ 5V 24 msec 16 msec
⑮ 3.7V 24 msec 16 msec
㉓㉖ 3.8V 0.66 msec = 1514 Hz
㉔㉕ 50 mV p-p 0.66 msec
㉗ 3.8V 1.33 msec = 750 Hz
㉘ 20 mV p-p 1.33 msec
㉙ 200 mV p-p 40 msec
㉚ 3.8V 40 msec

WF-S3

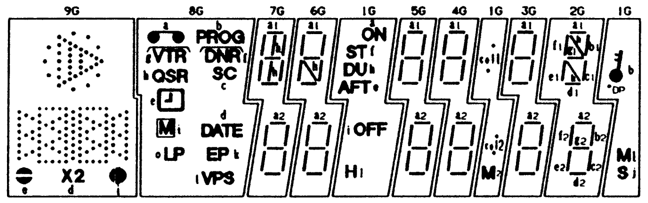
TM-1 BOARD DISPLAY, TIMER, SWITCH & TUNING CONTROL CIRCUIT DIAGRAM   TM-2 BOARD SWITCH, VR & H.P.JACK CIRCUIT DIAGRAM

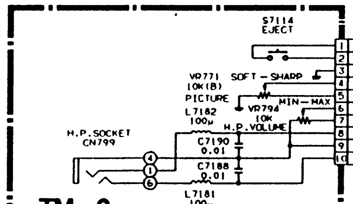

A7101
FLUORESCENT DISPLAY
IC711
M50959-292SP
TIMER/TUNER CONTROL M.P.U.
IC712
MN1280-L
RESET
TP711
CLK ADJUST
GND
KEY IN1
RB711
10K × 7
RB712
10K X4
B7184 DTA114EF SWITCH
B7185 DTA114EF SWITCH
B7186 DTA114EF SWITCH
B7189 DTC114EF SWITCH
B7190 DTC114EF SWITCH
D7771 BG3433S
D7772 BR3433S
D7773 BR3433S
DUAL SYSTEM LED
NICAM AUTO—OFF(MONO)
S7182
RR711 IR RECEIVER
S7137 ALL CLEAR
X7101
X7102
D7101 AK04-V2
D7184
CN711
SWD 5V
BACK UP 5V
SSB CLK
SSB DATA
PICTURE
ALWAYS 5V
AC 4V
AC 4V
ALWAYS -30V
GND
TO CP-21SY-B1 CN304
CN712
PLL CLK
PLL DATA
PLL CE
E2P ROM CLK
E2P ROM DATA
E2P ROM CS
TO CP-11TN-A1 CN602
CN796
NICAM SW
GND
TO CP-11TN-A1 CN604
CN797
BILINGUAL L
STEREO L
TO CP-11TN-A1 CN603
CN792
HIFI L
TO CP-11AD-A1 CN791
CN713
VIDEO MUTE
TU AUDIO MUTE
AFT C
SYNC L
VPS SCL
VPS SDA
TO CP-11TN-A1 CN601
CN714
KEY IN3
GND
PICTURE
SWD 5V
H.P.CTL
SWD 5V
H.P.RCH
GND
H.P.LCH
TO TM-2 CN724
CN794
H.P.LCH
GND
H.P.RCH
SWD 5V
H.P.CTL
TO CP-11AD-A1 CN253
TM-1
T1-12583/LP2H-EXF
NOTE NOT SPECIFIED DIODE ... GMA01 or 1SS133

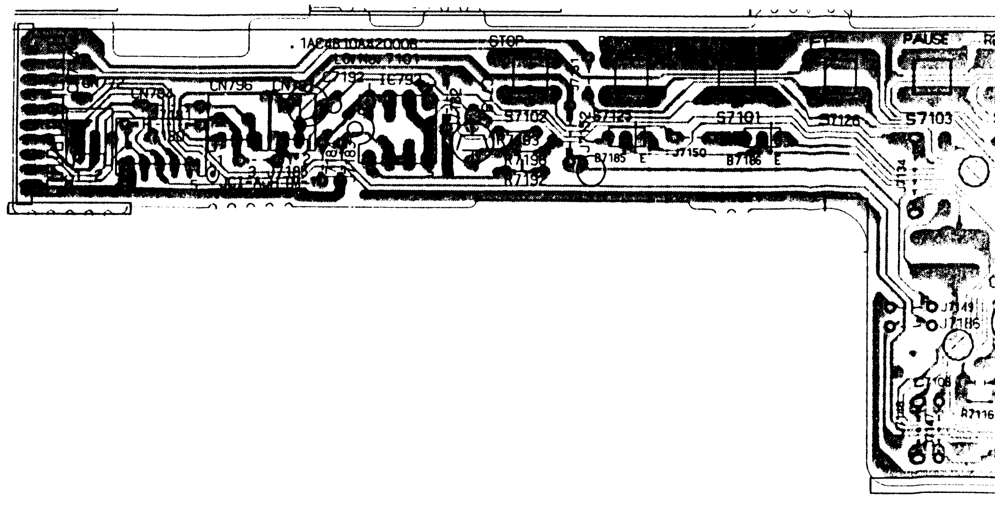
ANODE CONNECTION

	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	B	●‿●	a1	a1	a1	a1	a1	a1	ON
b	A	PROG.	b1	b1	b1	b1	b1	b1	●
c	-	SC	c1	c1	c1	c1	c1	c1	DP
d	×2	DATE	d1	d1	d1	d1	d1	d1	M(1)
e	⊖	◘	e1	e1	e1	e1	e1	e1	AFT
f	C	DNR	f1	f1	f1	f1	f1	f1	ST
g	D	VTR	g1	g1	g1	g1	g1	g1	col'1
h	-	QSR	/	\	-	-	-	\	DU
i	●	[M]	a2	a2	a2	a2	a2	a2	OFF
j	E	-	b2	b2	b2	b2	b2	b2	S
k	I	EP	c2	c2	c2	c2	c2	c2	-
l	H	VPS	d2	d2	d2	d2	d2	d2	H
m	J	-	e2	e2	e2	e2	e2	e2	M(2)
n	F	-	f2	f2	f2	f2	f2	f2	-
o	G	LP	g2	g2	g2	g2	g2	g2	col'2

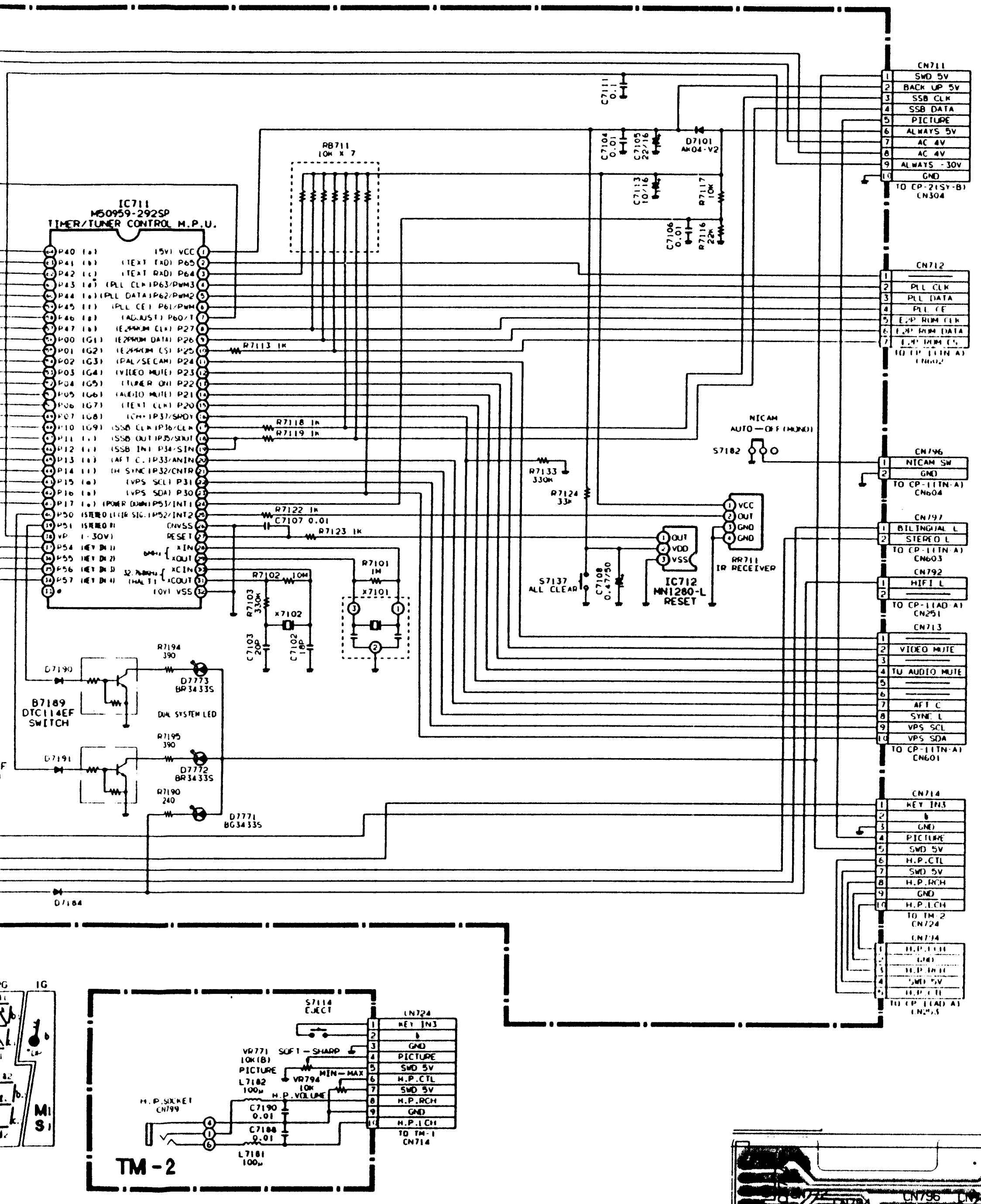
GRID ASSIGNMENT


9G
8G
7G
6G
1G
5G
4G
1G
3G
2G
1G
PROG
VTR
DNR
QSR
SC
DATE
EP
LP
VPS
X2
ON
ST
DU
AFT
OFF
H
M
S
DP

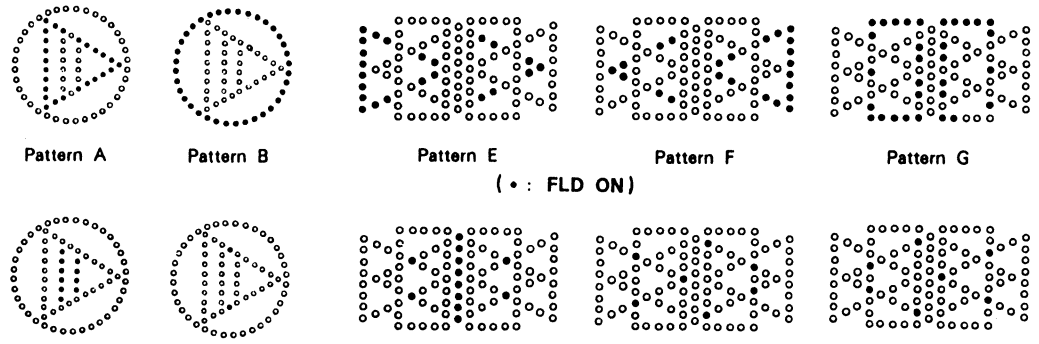

S7114 EJECT
CN724
KEY IN3
GND
PICTURE
SWD 5V
H.P.CTL
SWD 5V
H.P.RCH
GND
H.P.LCH
TO TM-1 CN714
VR771 10K(B) PICTURE
SOFT — SHARP
VR794 10K H.P.VOLUME
MIN—MAX
L7182 100μ
C7190 0.01
C7188 0.01
L7181 100μ
H.P.SOCKET CN799
TM-2


CN796
CN792
STOP
PAUSE
S7102
S7101
S7126
S7103
B7185
B7186
R7116

GRAM TM-2 BOARD SWITCH, VR & H.P.JACK CIRCUIT DIAGRAM


IC711
M50959-292SP
TIMER/TUNER CONTROL M.P.U.
RB711
10K X 7
C7111
C7104
0.01
C7105
22/16
D7101
MA04-V2
R7117
10K
C7113
10/16
C7106
0.01
R7116
22K
R7113 1K
R7118 1K
R7119 1K
R7122 1K
C7107 0.01
R7123 1K
R7102 10M
R7101 1M
X7101
X7102
R7103 330K
C7103 20P
C7102 10P
R7133 330K
R7124 33K
S7137 ALL CLEAR
C7108 0.47/50
IC712
MN1280-L
RESET
RR711
IR RECEIVER
VCC
OUT
GND
VDD
VSS
NICAM
AUTO — OFF (MONO)
S7182
D7190
B7189
DTC114EF
SWITCH
R7194 390
D7773 BR3433S
DIAL SYSTEM LED
D7191
R7195 390
D7772 BR3433S
R7190 240
D7771 BG3433S
D7184
CN711
1 SWD 5V
2 BACK UP 5V
3 SSB CLK
4 SSB DATA
5 PICTURE
6 ALWAYS 5V
7 AC 4V
8 AC 4V
9 ALWAYS -30V
10 GND
TO CP-2(SY-B)
CN304
CN712
1
2 PLL CLK
3 PLL DATA
4 PLL CE
5 E2P ROM CLK
6 E2P ROM DATA
7 E2P ROM CS
TO CP-1(TN-A)
CN602
CN796
1 NICAM SW
2 GND
TO CP-1(TN-A)
CN604
CN797
1 BILINGUAL L
2 STEREO L
TO CP-1(TN-A)
CN603
CN792
1 HIFI L
2
TO CP-1(AD-A)
CN251
CN713
1
2 VIDEO MUTE
3
4 TU AUDIO MUTE
5
6
7 AFT C
8 SYNC L
9 VPS SCL
10 VPS SDA
TO CP-1(TN-A)
CN601
CN714
1 KEY IN3
2
3 GND
4 PICTURE
5 SWD 5V
6 H.P.CTL
7 SWD 5V
8 H.P.RCH
9 GND
10 H.P.LCH
TO TM-2
CN724
CN794
1 H.P.LCH
2 GND
3 H.P.RCH
4 SWD 5V
5 H.P.CTL
TO CP-1(AD-A)
CN253
1G
S7114
EJECT
VR771
10K(B)
PICTURE
SOFT — SHARP
VR794
10K
MIN — MAX
H.P.VOLUME
L7182
100μ
L7181
100μ
C7190
0.01
C7188
0.01
H.P.SOCKET
CN799
CN724
1 KEY IN3
2
3 GND
4 PICTURE
5 SWD 5V
6 H.P.CTL
7 SWD 5V
8 H.P.RCH
9 GND
10 H.P.LCH
TO TM-1
CN714
TM-2

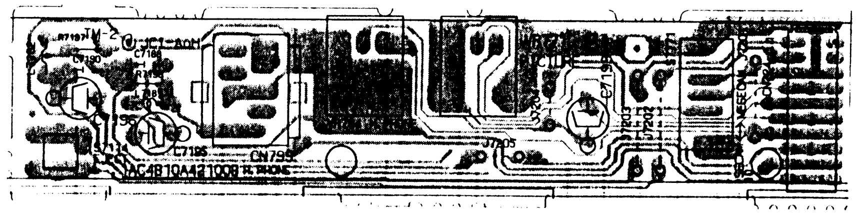
9G: GRAPHIC MODE DISPLAY


Pattern A
Pattern B
Pattern E
Pattern F
Pattern G

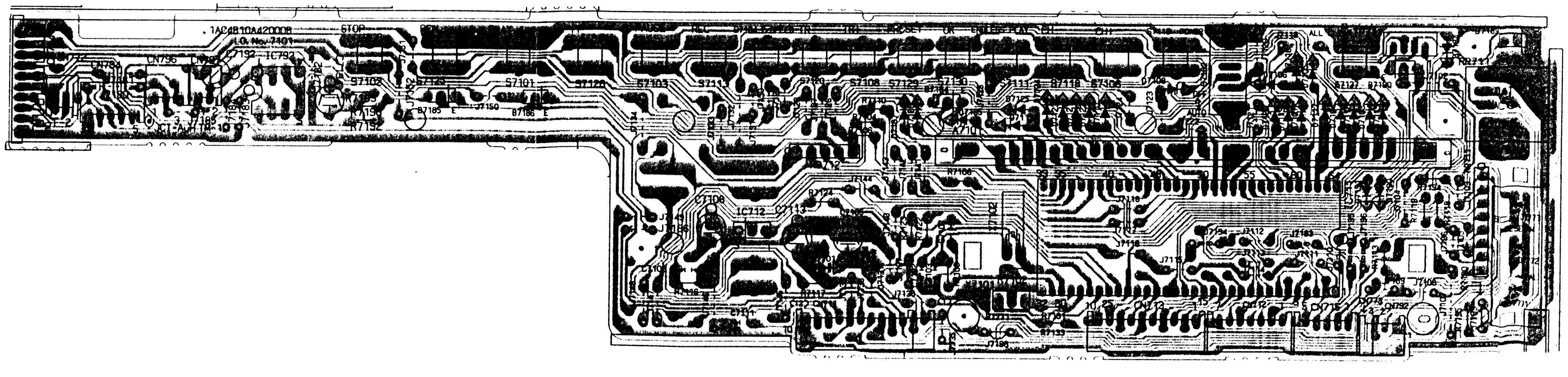
(• : FLD ON)

Pattern C
Pattern D
Pattern H
Pattern I
Pattern J

TM-2 P.C.B.

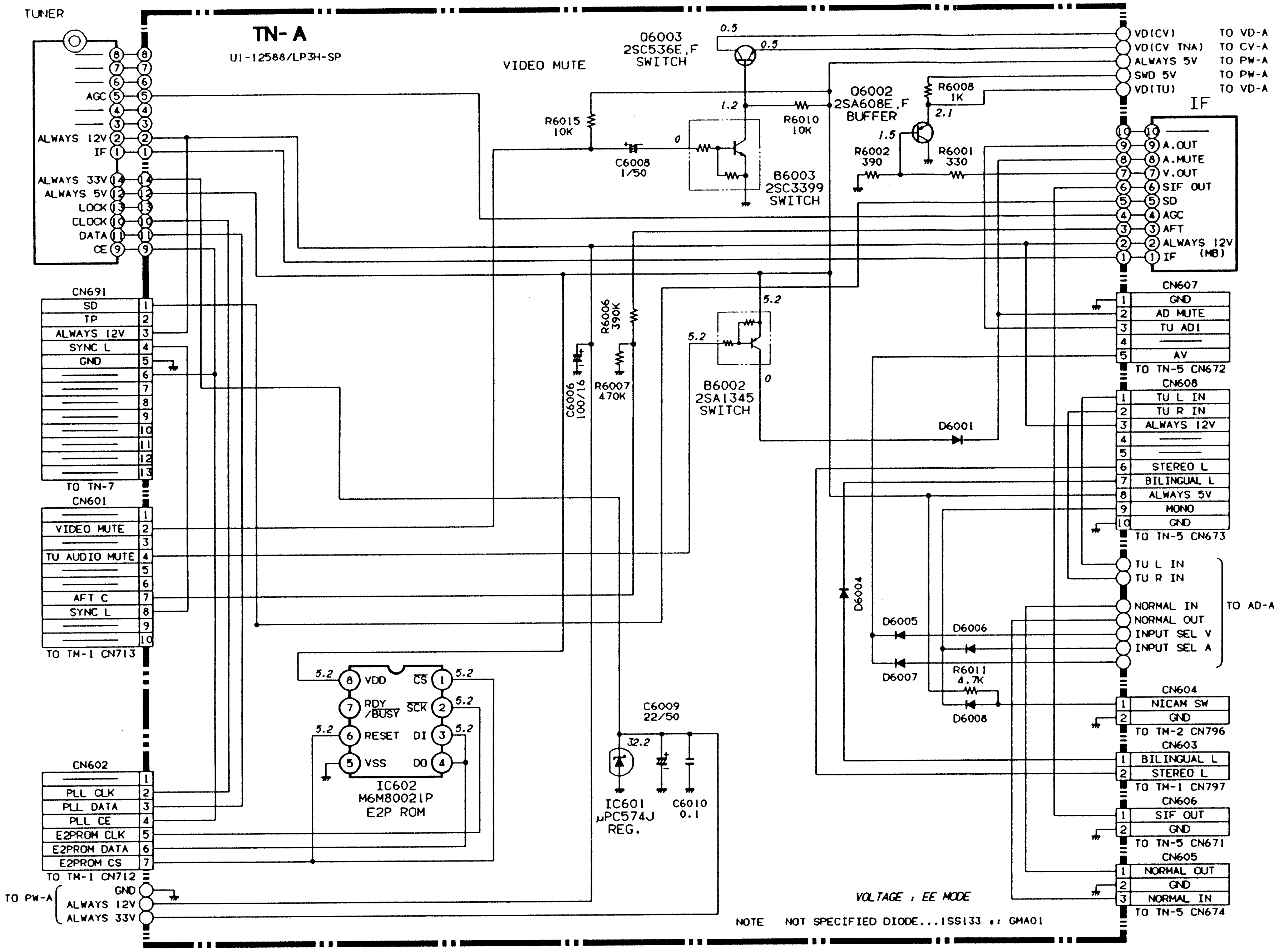

CN799
1AC4B10A4B1008

TM-1 P.C.B.

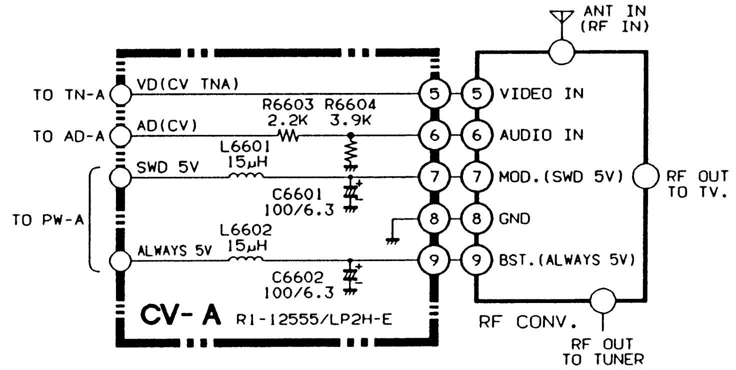

1AC4B10A420008
LG No. 7401
STOP
CN796
CN792
IC792
S7108
S7150
S7101
S7120
S7103
S7108
S7129
B7186
B7185
R7192
IC712
C7113
C7108
R7108
ALL

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

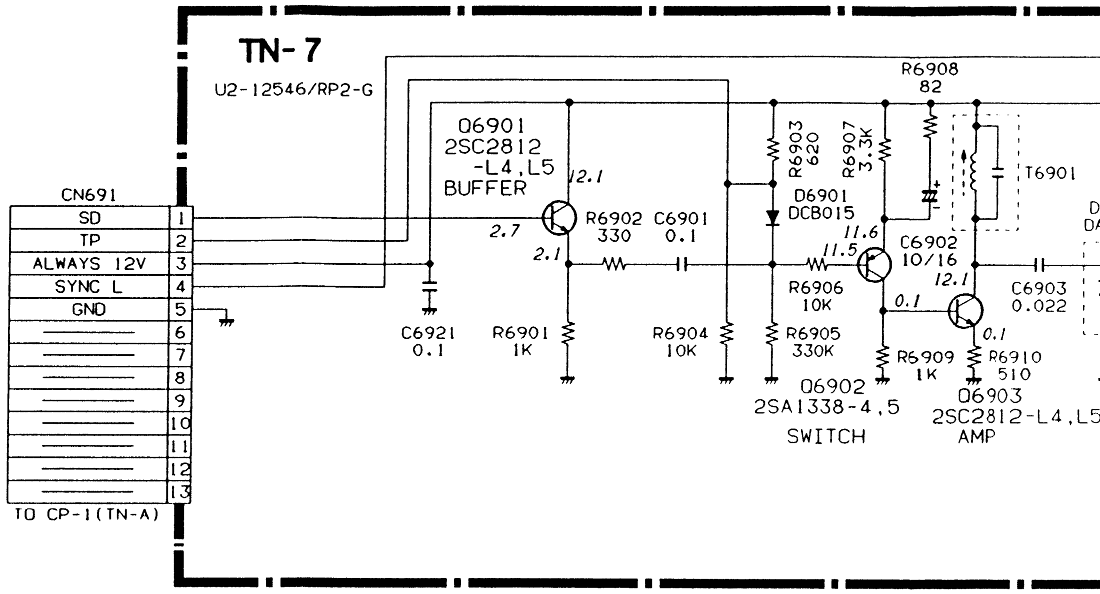
CP-1 BOARD (TN-A) TUNER IF CONNECTION CIRCUIT DIAGRAM


TN-A
U1-12588/LP3H-SP
TUNER
AGC
ALWAYS 12V
IF
ALWAYS 33V
ALWAYS 5V
LOCK
CLOCK
DATA
CE
VIDEO MUTE
Q6003
2SC536E,F
SWITCH
Q6002
2SA608E,F
BUFFER
R6008
1K
R6015
10K
R6010
10K
C6008
1/50
B6003
2SC3399
SWITCH
R6002
390
R6001
330
R6006
390K
R6007
470K
C6006
100/16
B6002
2SA1345
SWITCH
D6001
D6004
D6005
D6006
D6007
D6008
R6011
4.7K
CN691
SD
TP
ALWAYS 12V
SYNC L
GND
TO TN-7
CN601
VIDEO MUTE
TU AUDIO MUTE
AFT C
SYNC L
TO TM-1 CN713
IC602
M6M80021P
E2P ROM
VDD
RDY /BUSY
RESET
VSS
CS
SCK
DI
DO
C6009
22/50
IC601
μPC574J
REG.
C6010
0.1
CN602
PLL CLK
PLL DATA
PLL CE
E2PROM CLK
E2PROM DATA
E2PROM CS
TO TM-1 CN712
TO PW-A
GND
ALWAYS 12V
ALWAYS 33V
VD(CV) TO VD-A
VD(CV TNA) TO CV-A
ALWAYS 5V TO PW-A
SWD 5V TO PW-A
VD(TU) TO VD-A
IF
A.OUT
A.MUTE
V.OUT
SIF OUT
SD
AGC
AFT
ALWAYS 12V
IF (MB)
CN607
GND
AD MUTE
TU ADI
AV
TO TN-5 CN672
CN608
TU L IN
TU R IN
ALWAYS 12V
STEREO L
BILINGUAL L
ALWAYS 5V
MONO
GND
TO TN-5 CN673
TU L IN
TU R IN
NORMAL IN
NORMAL OUT
INPUT SEL V
INPUT SEL A
TO AD-A
CN604
NICAM SW
GND
TO TM-2 CN796
CN603
BILINGUAL L
STEREO L
TO TM-1 CN797
CN606
SIF OUT
GND
TO TN-5 CN671
CN605
NORMAL OUT
GND
NORMAL IN
TO TN-5 CN674
VOLTAGE : EE MODE
NOTE NOT SPECIFIED DIODE...1SS133 or GMA01

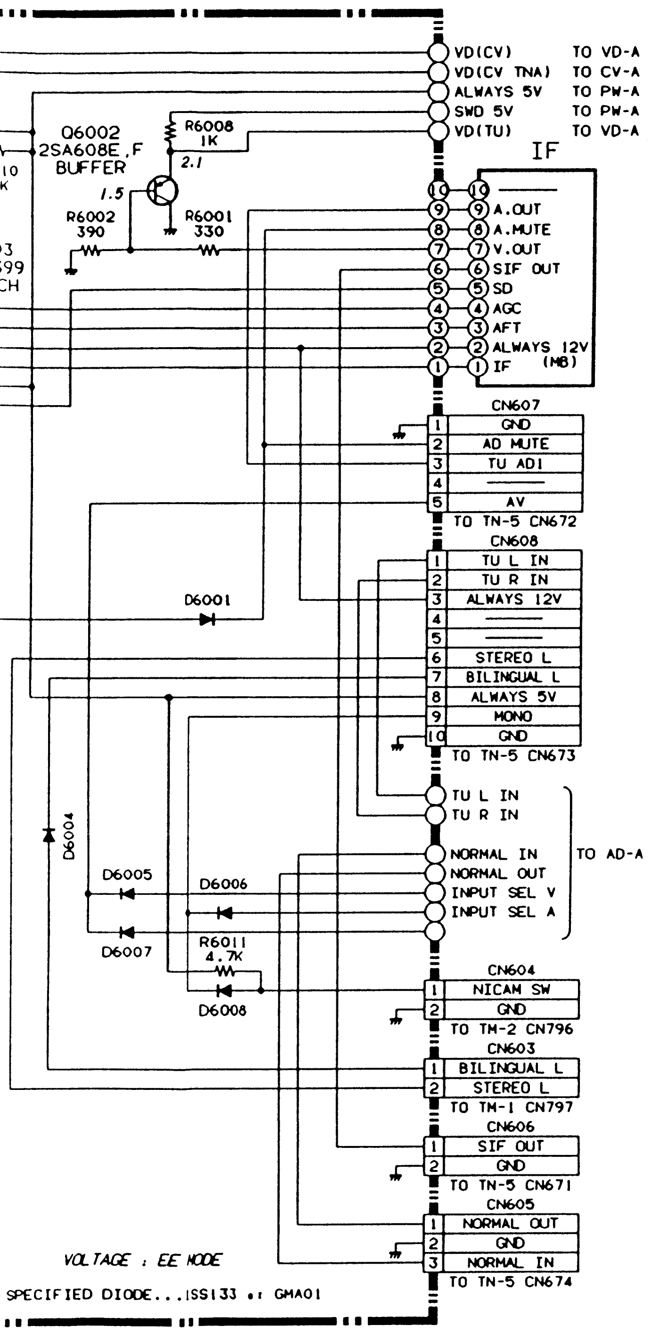
CP-1 BOARD (CV-A) RF CONVERTER CONNECTION CIRCUIT DIAGRAM


TO TN-A
VD(CV TNA)
TO AD-A
AD(CV)
R6603 2.2K
R6604 3.9K
L6601 15μH
SWD 5V
TO PW-A
C6601 100/6.3
L6602 15μH
ALWAYS 5V
C6602 100/6.3
CV-A
R1-12555/LP2H-E
ANT IN (RF IN)
VIDEO IN
AUDIO IN
MOD.(SWD 5V)
GND
BST.(ALWAYS 5V)
RF OUT TO TV.
RF CONV.
RF OUT TO TUNER

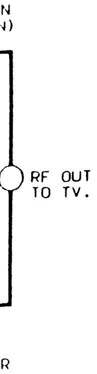
TN-7 BOARD SYNC DET. CIRCUIT DIAGRAM


TN-7
U2-12546/RP2-G
CN691
SD
TP
ALWAYS 12V
SYNC L
GND
TO CP-1(TN-A)
Q6901
2SC2812
-L4,L5
BUFFER
C6921
0.1
R6901
1K
R6902
330
C6901
0.1
R6904
10K
R6903
620
R6907
3.3K
D6901
DCB015
R6906
10K
R6905
330K
Q6902
2SA1338-4,5
SWITCH
R6908
82
C6902
10/16
R6909
1K
R6910
510
Q6903
2SC2812-L4,L5
AMP
C6903
0.022
T6901

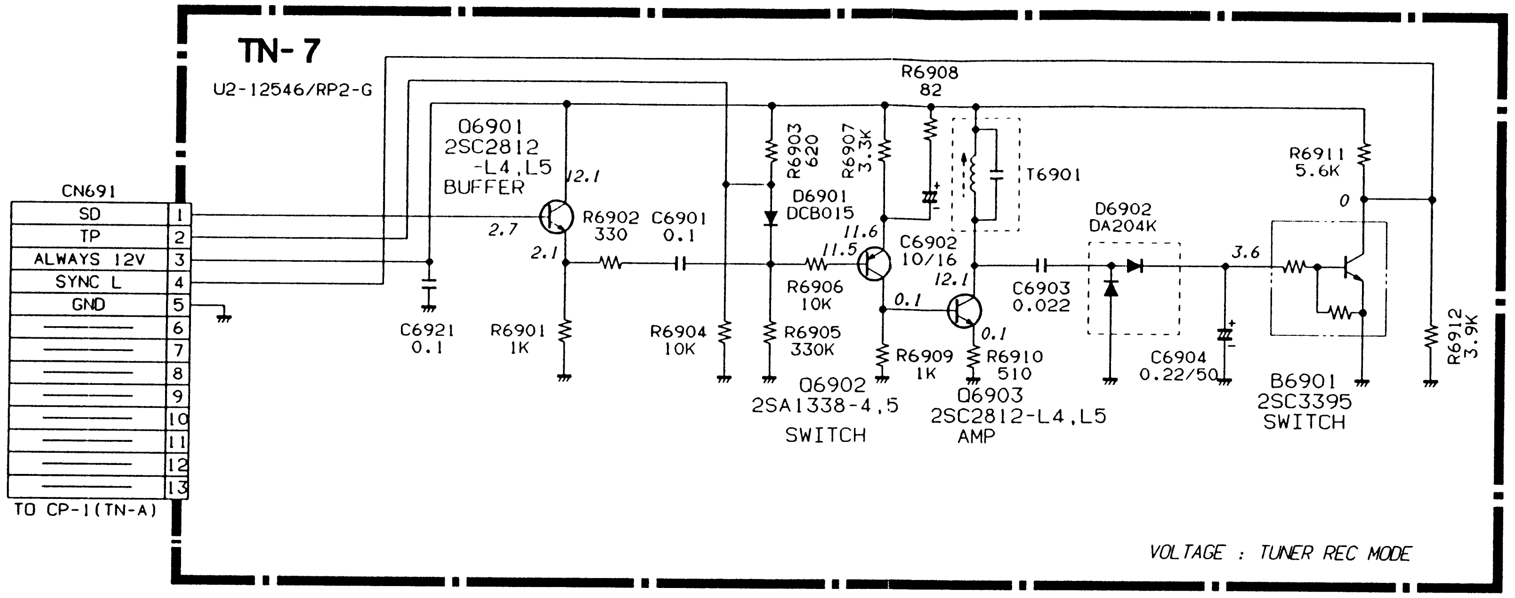
CUIT DIAGRAM


VD(CV) TO VD-A
VD(CV TNA) TO CV-A
ALWAYS 5V TO PW-A
SWD 5V TO PW-A
VD(TU) TO VD-A
IF
Q6002
2SA608E,F
BUFFER
R6008
1K
2.1
1.5
R6002
390
R6001
330
10
K
3
99
CH
10
9 A.OUT
8 A.MUTE
7 V.OUT
6 SIF OUT
5 SD
4 AGC
3 AFT
2 ALWAYS 12V (MB)
1 IF
CN607
1 GND
2 AD MUTE
3 TU ADI
4
5 AV
TO TN-5 CN672
CN608
1 TU L IN
2 TU R IN
3 ALWAYS 12V
4
5
6 STEREO L
7 BILINGUAL L
8 ALWAYS 5V
9 MONO
10 GND
TO TN-5 CN673
D6001
TU L IN
TU R IN
NORMAL IN
NORMAL OUT
INPUT SEL V
INPUT SEL A
TO AD-A
D6004
D6005
D6006
D6007
R6011
4.7K
D6008
CN604
1 NICAM SW
2 GND
TO TM-2 CN796
CN603
1 BILINGUAL L
2 STEREO L
TO TM-1 CN797
CN606
1 SIF OUT
2 GND
TO TN-5 CN671
CN605
1 NORMAL OUT
2 GND
3 NORMAL IN
TO TN-5 CN674
VOLTAGE : EE MODE
SPECIFIED DIODE...1SS133 •: GMA01

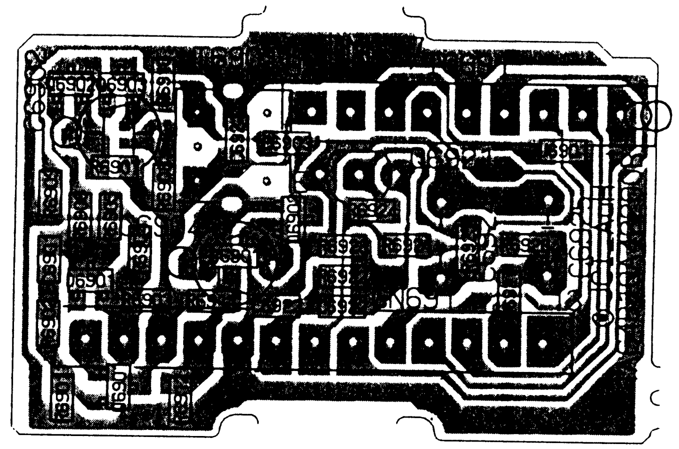
UIT DIAGRAM


N
)
RF OUT
TO TV.
R

TN-7 BOARD SYNC DET. CIRCUIT DIAGRAM

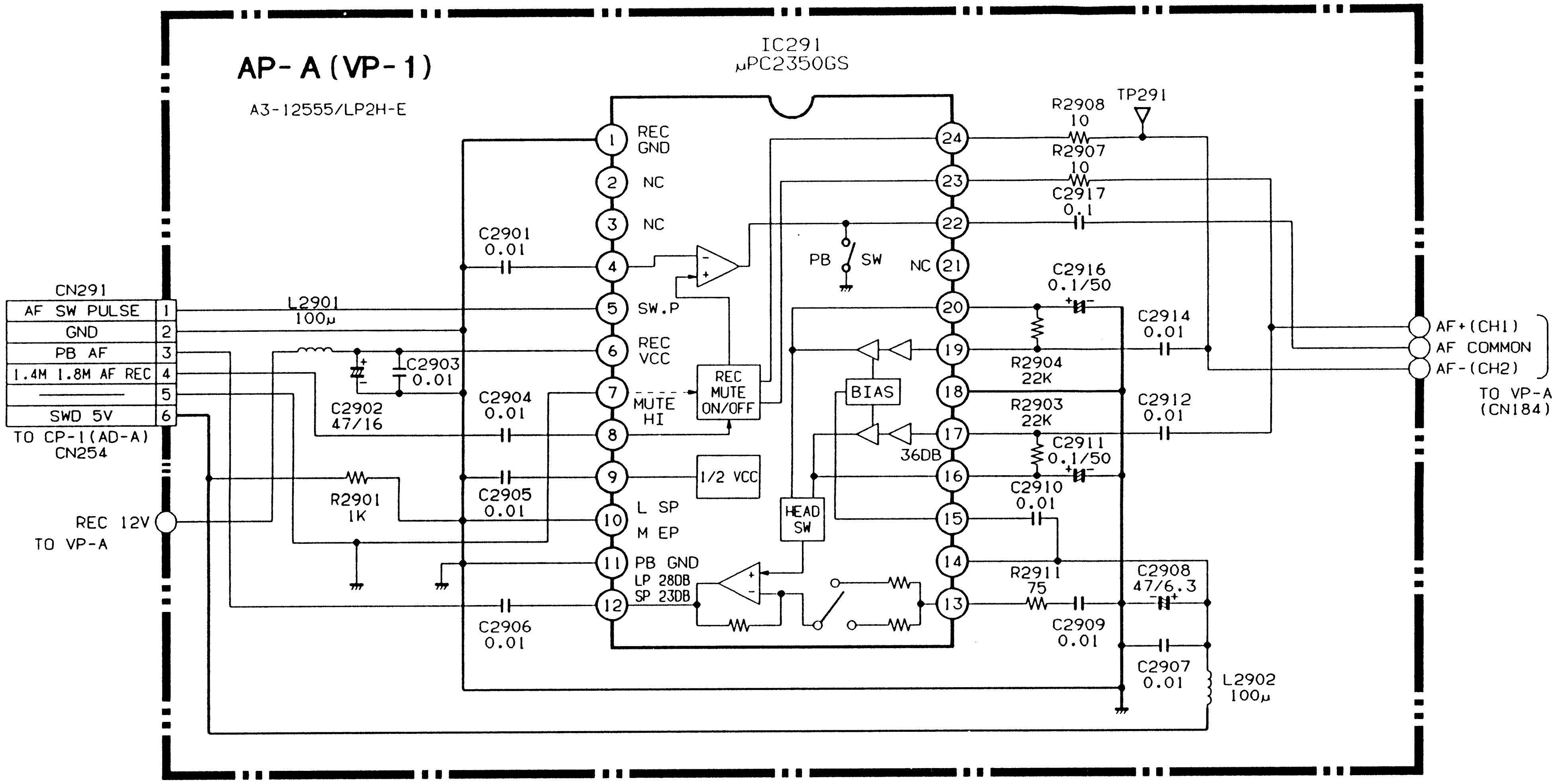

TN-7
U2-12546/RP2-G
CN691
1 SD
2 TP
3 ALWAYS 12V
4 SYNC L
5 GND
6
7
8
9
10
11
12
13
TO CP-1(TN-A)
Q6901
2SC2812
-L4,L5
BUFFER
12.1
2.7
2.1
R6902
330
C6901
0.1
C6921
0.1
R6901
1K
R6904
10K
R6903
620
R6907
3.3K
D6901
DCB015
11.6
11.5
R6906
10K
R6905
330K
Q6902
2SA1338-4,5
SWITCH
R6908
82
T6901
C6902
10/16
12.1
0.1
0.1
R6909
1K
R6910
510
Q6903
2SC2812-L4,L5
AMP
C6903
0.022
D6902
DA204K
C6904
0.22/50
3.6
R6911
5.6K
0
B6901
2SC3395
SWITCH
R6912
3.9K
VOLTAGE : TUNER REC MODE

TN-7 P.C.B.

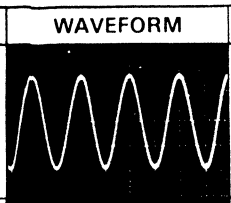
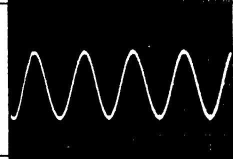
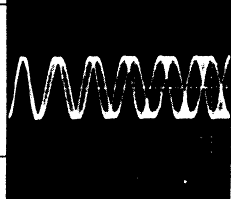
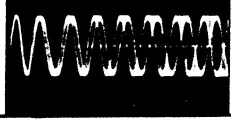


K
J
I
H
G
F
E
D
C
B
A

VP-1 BOARD (AP-A) AUDIO PRE-AMP CIRCUIT DIAGRAM

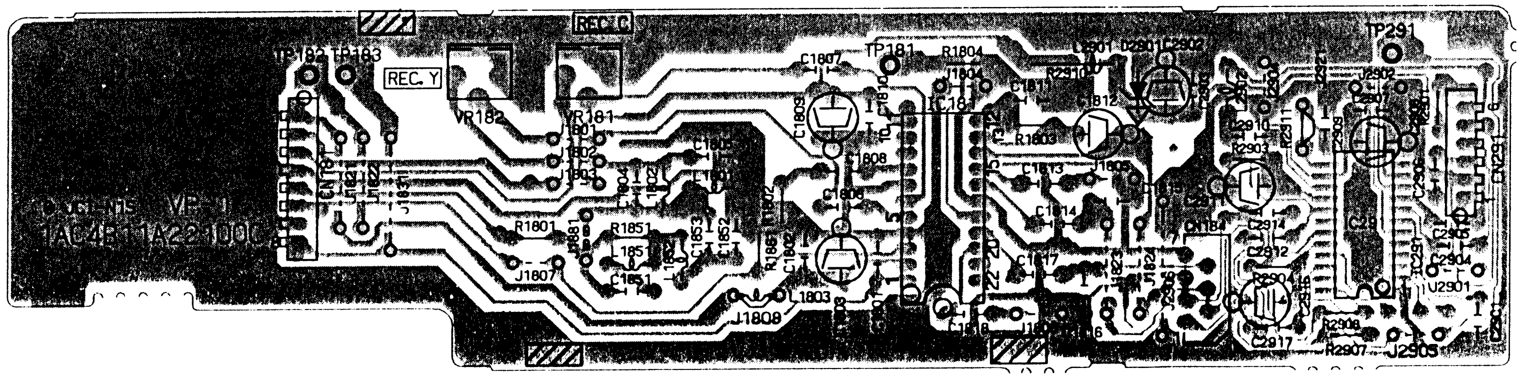

AP-A (VP-1)
A3-12555/LP2H-E
IC291
μPC2350GS
REC GND
NC
NC
SW.P
REC VCC
MUTE HI
L SP
M EP
PB GND
LP 28DB
SP 23DB
REC MUTE ON/OFF
1/2 VCC
BIAS
HEAD SW
36DB
PB SW
NC
CN291
AF SW PULSE
GND
PB AF
1.4M 1.8M AF REC
SWD 5V
TO CP-1(AD-A) CN254
REC 12V
TO VP-A
L2901 100μ
C2902 47/16
C2903 0.01
R2901 1K
C2901 0.01
C2904 0.01
C2905 0.01
C2906 0.01
R2908 10
R2907 10
TP291
C2917 0.1
C2916 0.1/50
R2904 22K
R2903 22K
C2911 0.1/50
C2910 0.01
R2911 75
C2909 0.01
C2914 0.01
C2912 0.01
C2908 47/6.3
C2907 0.01
L2902 100μ
AF+(CH1)
AF COMMON
AF-(CH2)
TO VP-A (CN184)

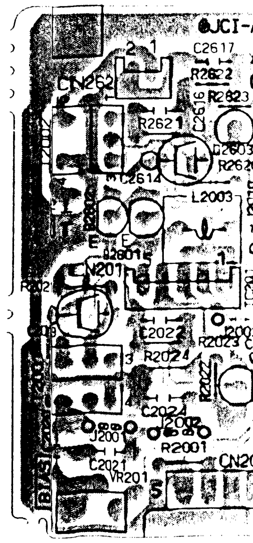
WAVEFORM OF Hi-Fi AUDIO

TEST LOCATION	WAVEFORM
IC231 Pin 68 (L ch) and Pin 78 (R ch)	
IC231 Pin 42 (L ch) Pin 23 (R ch)	
IC231 Pin 38 L ch	
IC231 Pin 28 R ch	

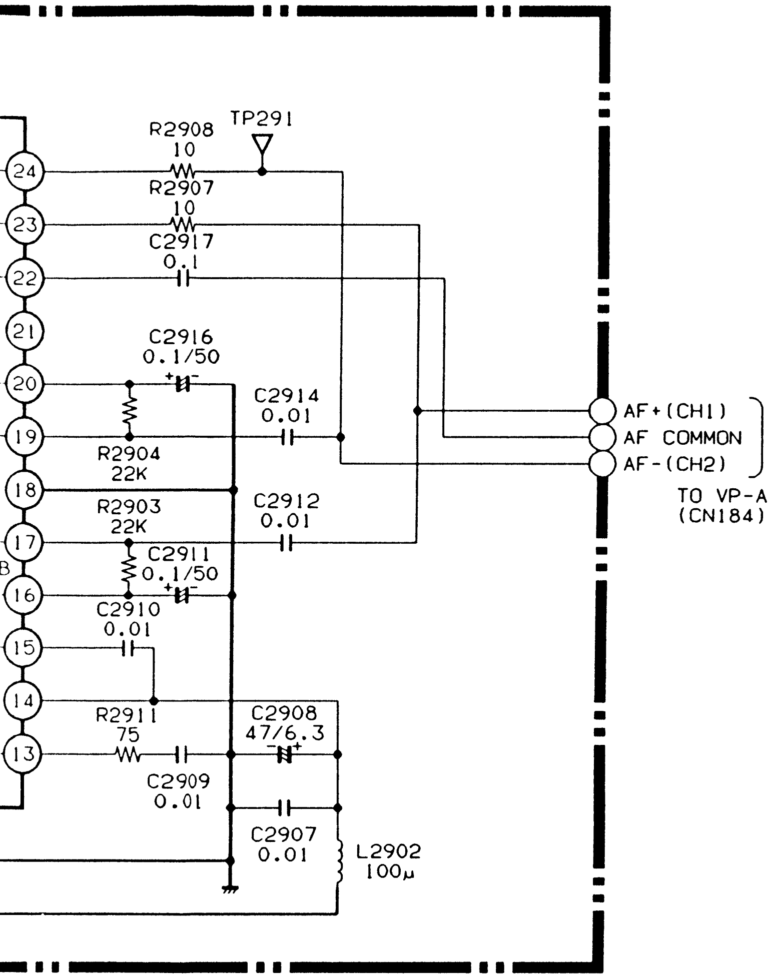
NOTE:
Audio input Condition is 1 KHz sine-wave si

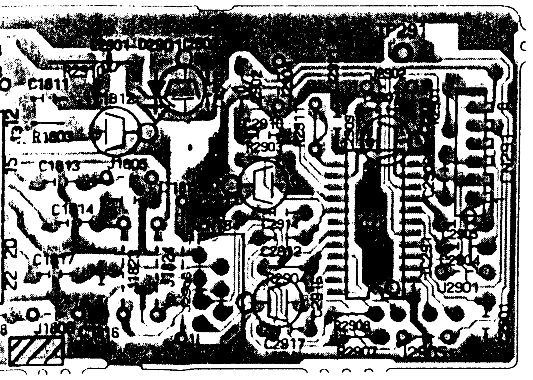
VP-1 P.C.B.





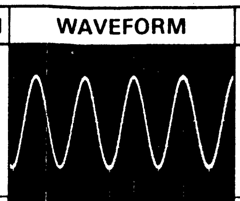
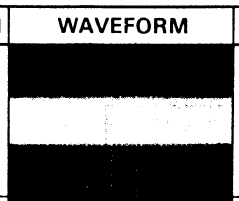
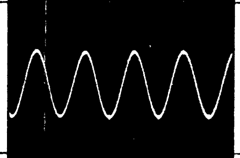
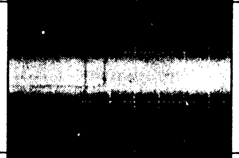
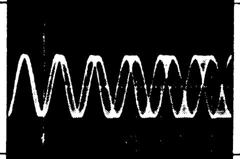
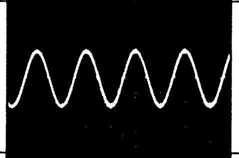
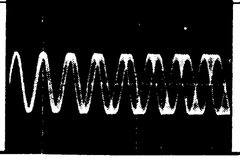
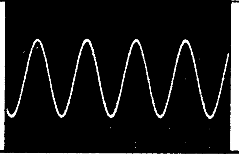
IT DIAGRAM


R2908
10
TP291
R2907
10
C2917
0.1
C2916
0.1/50
C2914
0.01
R2904
22K
R2903
22K
C2912
0.01
C2911
0.1/50
C2910
0.01
R2911
75
C2908
47/6.3
C2909
0.01
C2907
0.01
L2902
100µ
24
23
22
21
20
19
18
17
16
15
14
13
AF+(CH1)
AF COMMON
AF-(CH2)
TO VP-A
(CN184)


C1811
R1803
C1813
C1814
C1817
C2917
J2901
CN201

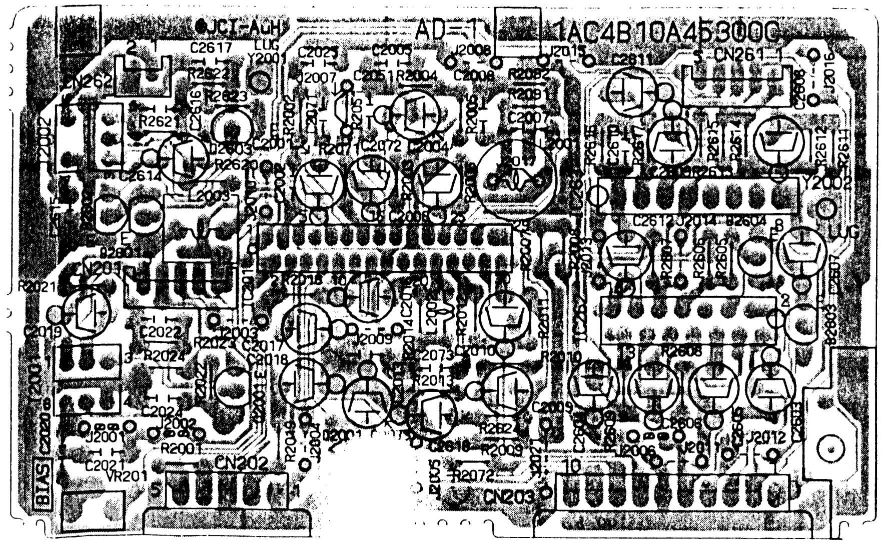
WAVEFORM OF Hi-Fi AUDIO

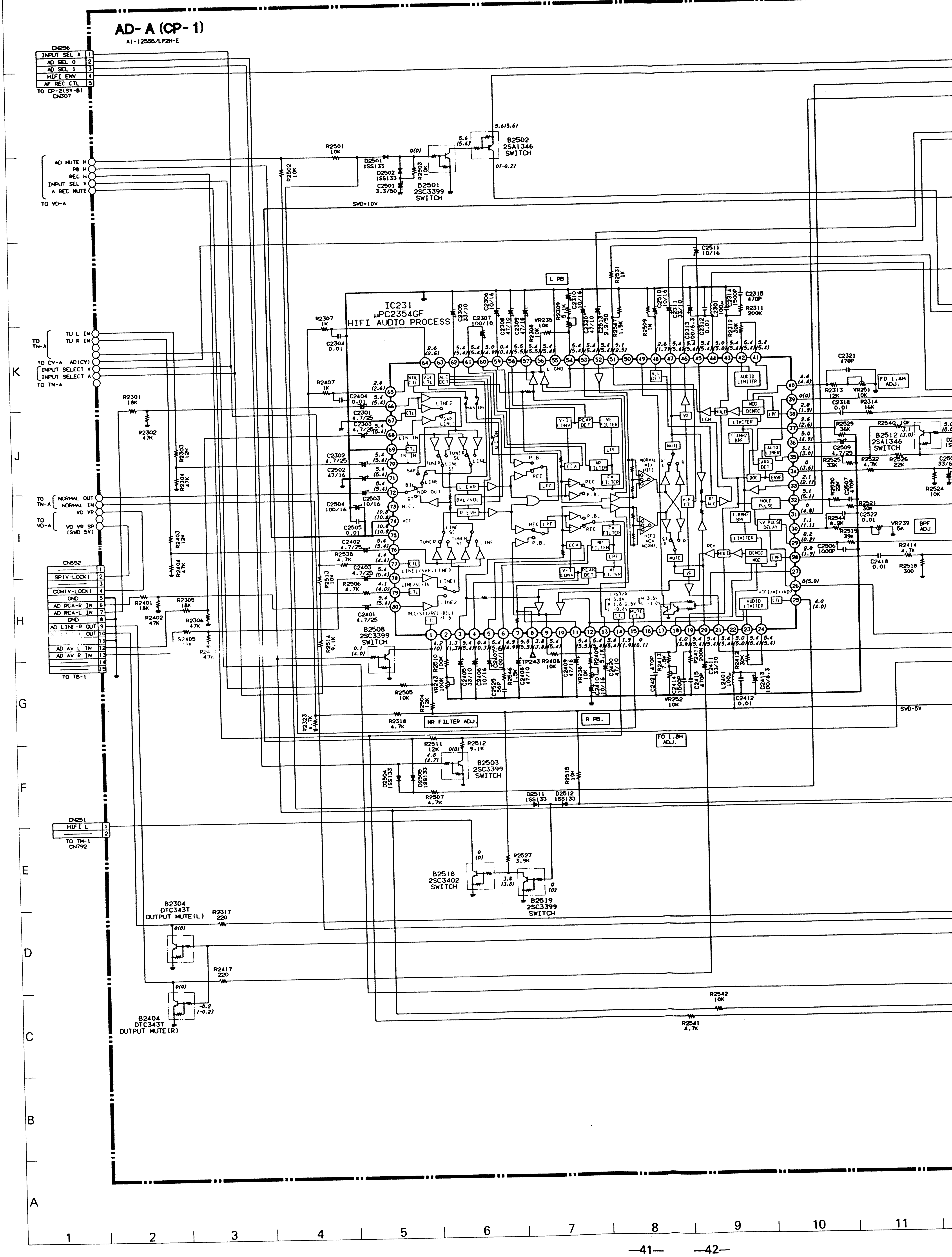
WF-A1

TEST LOCATION	WAVEFORM	MODE/LEVEL	TEST LOCATION	WAVEFORM	MODE/LEVEL
IC231 Pin 68 (L ch) and Pin 78 (R ch)		REC 0.7 Vp-p AV Input	CN254 Pin 4		REC 100m Vp-p 1.4M/1.8M AF REC
IC231 Pin 42 (L ch) Pin 23 (R ch)		REC 0.5 Vp-p Modulation Level	CN254 Pin 3		PB 1.5 Vp-p AF PB
IC231 Pin 38 L ch		REC 1.2 Vp-p 1.4MHz Carrier	IC231 Pin 56 (L ch) Pin 9 (R ch)		REC/PB 1.1 Vp-p AD Level
IC231 Pin 28 R ch		REC 1.2 Vp-p 1.8 MHz Carrier	IC231 Pin 47 (L ch) Pin 20 (R ch)		REC/PB 1.5 Vp-p Audio Output

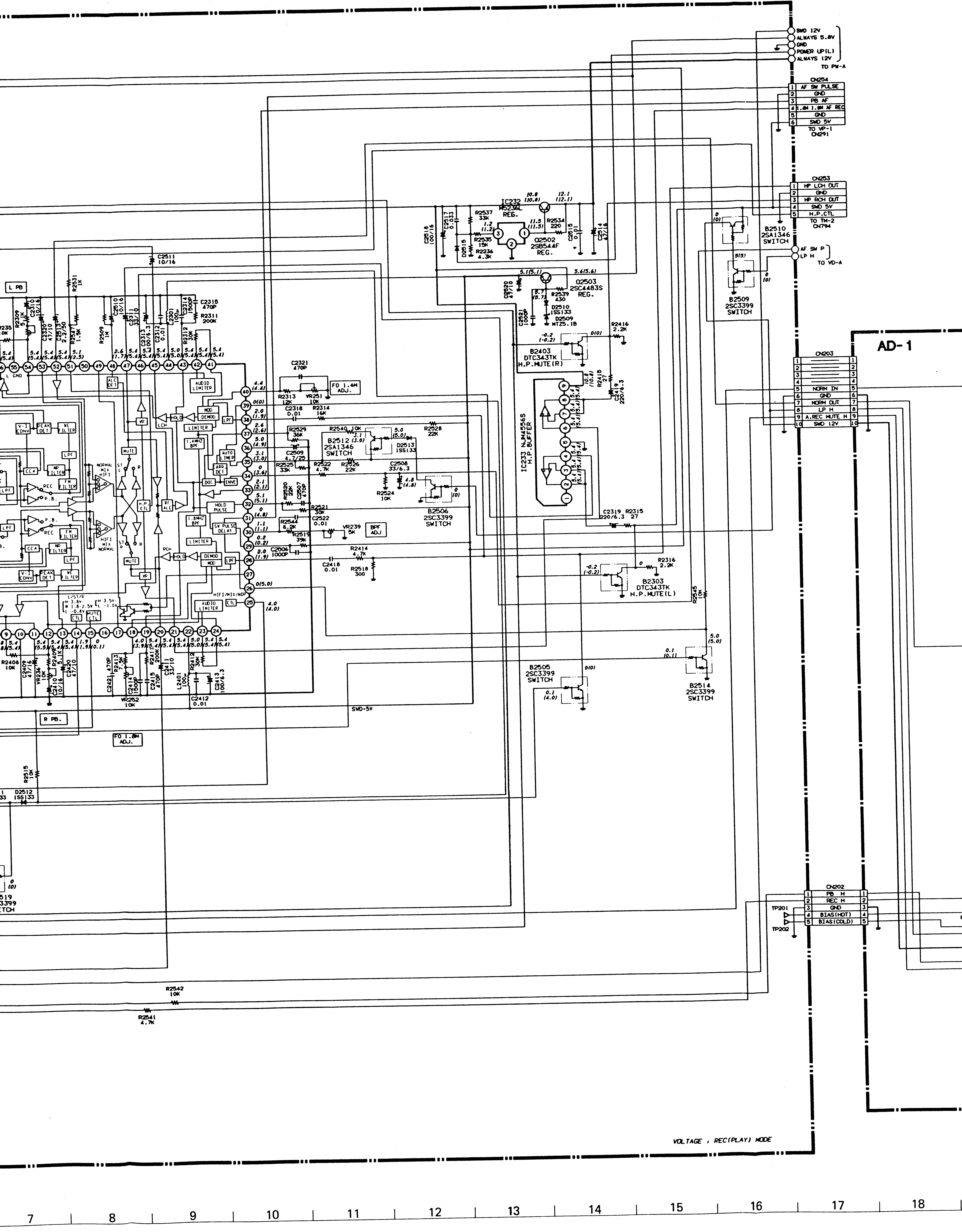
NOTE:
Audio input Condition is 1 KHz sine-wave signal from AV terminal.

AD-1 P.C.B.

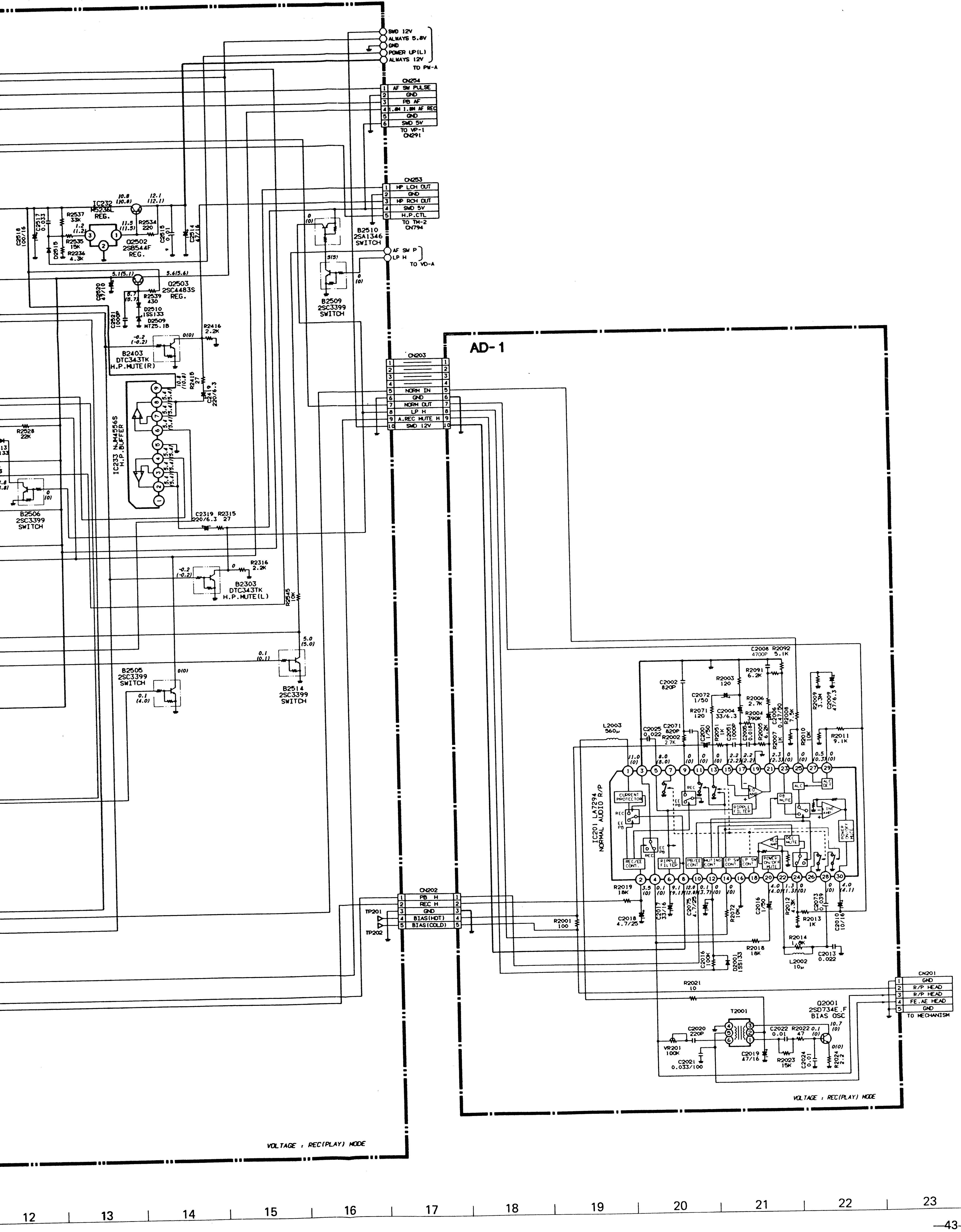

JCT-ACH
AD-1
1AC4B10A45300G
CN261
C2617
C2023
C2005
C2006
R2082
R2081
C2007
C2051
R2004
C2611
R2622
R2623
R2621
R2071
R2072
C2614
C2612
C2014
R2604
R2605
C2022
R2024
R2023
C2017
C2018
R2073
C2010
R2010
R2608
C2009
R2621
C2024
C2002
C2001
R2001
C2021
VR201
CN202
CN203
R2072
R2082
C2012
R2606
R2803
C2020
C2019
BIAS


AD-A (CP-1)
A1-12555/LP2H-E
CN256
INPUT SEL A
AD SEL 0
AD SEL 1
HIFI ENV
AF REC CTL
TO CP-2(SY-B) CN307
AD MUTE H
PB H
REC H
INPUT SEL V
A REC MUTE
TO VD-A
R2501 10K
D2501 1SS133
D2502 1SS133
C2501 3.3/50
B2501 2SC3399 SWITCH
B2502 2SA1346 SWITCH
R2502 10K
R2503 10K
SWD+10V
TO TN-A
TU L IN
TU R IN
TO CV-A AD(CV)
INPUT SELECT V
INPUT SELECT A
TO TN-A
IC231
μPC2354GF
HIFI AUDIO PROCESS
L PB
R PB.
C2511 10/16
R2531 1K
C2315 470P
R2311 200K
C2321 470P
FO 1.4M ADJ.
R2313 12K
VR251 10K
R2314 16K
C2318 0.01
R2540 10K
R2529 36K
B2512 2SA1346 SWITCH
C2509 4.7/25
R2525 33K
R2522 4.7K
R2526 22K
R2524 10K
R2521 30K
C2522 0.01
VR239 5K
BPF ADJ
R2519 39K
R2544 8.2K
R2414 4.7K
C2506 1000P
C2418 0.01
R2518 300
TO TN-A NORMAL OUT
NORMAL IN
VD VR
TO VD-A VD VR SP (SWD 5V)
CN852
SP(V-LOCK)
COM(V-LOCK)
GND
AD RCA-R IN
AD RCA-L IN
GND
AD LINE-R OUT
AD LINE-L OUT
AD AV L IN
AD AV R IN
TO TB-1
R2301 18K
R2302 47K
R2303 12K
R2304 47K
R2403 12K
R2404 47K
R2401 18K
R2402 47K
R2305 18K
R2306 47K
R2405 18K
B2508 2SC3399 SWITCH
R2505 10K
R2504 12K
R2318 4.7K
NR FILTER ADJ.
FO 1.8M ADJ.
SWD-5V
R2511 12K
R2512 9.1K
B2503 2SC3399 SWITCH
D2504 1SS133
D2505 1SS133
R2507 4.7K
D2511 1SS133
D2512 1SS133
R2515 10K
CN251
HIFI L
TO TM-1 CN792
B2518 2SC3402 SWITCH
R2527 3.9K
B2519 2SC3399 SWITCH
B2304 DTC343T OUTPUT MUTE(L)
R2317 220
R2417 220
B2404 DTC343T OUTPUT MUTE(R)
R2542 10K
R2541 4.7K
TP243
VR243
VR252 10K
L2401 100μ
A
B
C
D
E
F
G
H
I
J
K
1
2
3
4
5
6
7
8
9
10
11

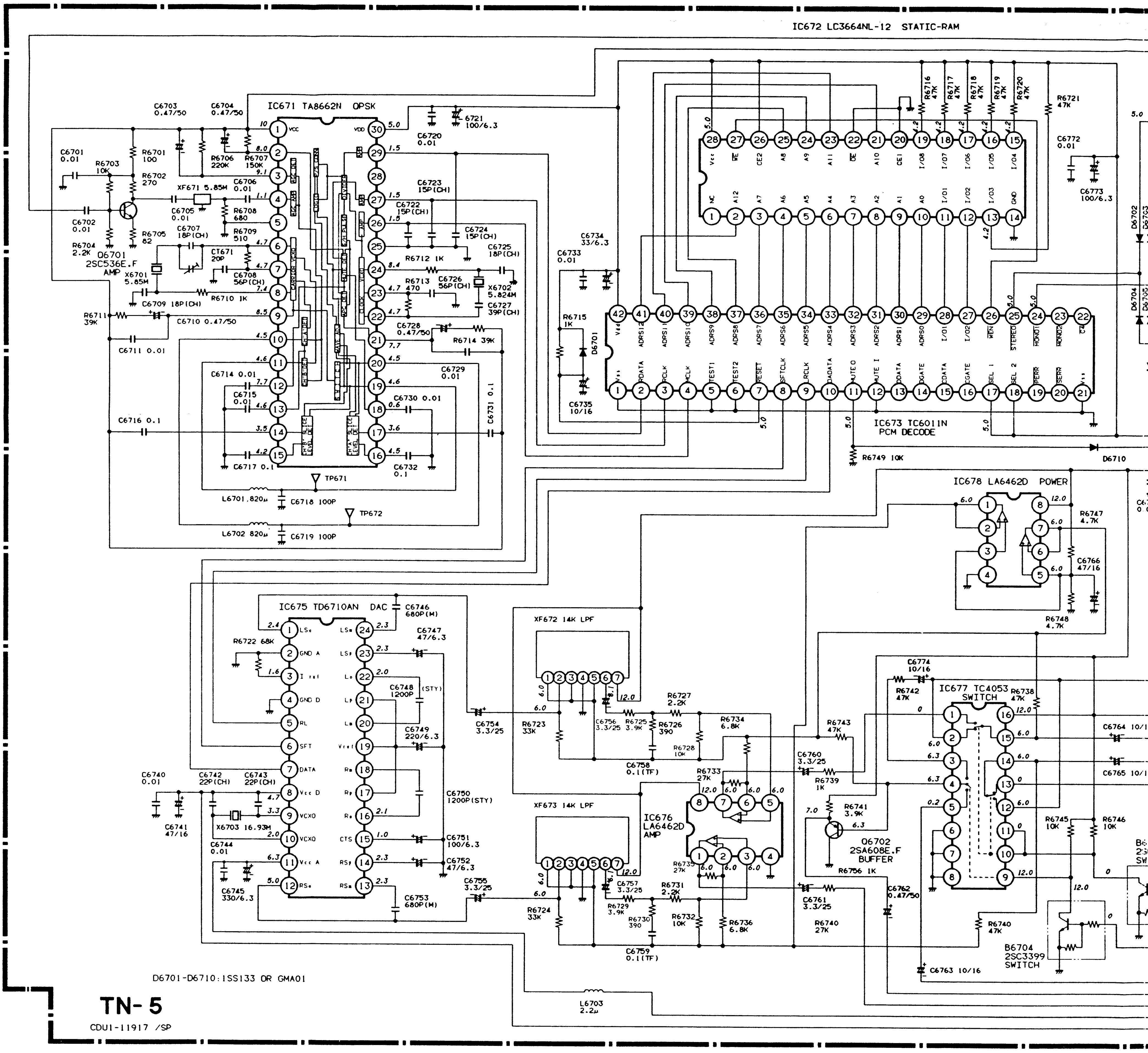
CP-1 BOARD (AD-A) HIFI AUDIO & AD-1 BOARD NORMAL AUDIO CIRCUIT DIAGRAM


SWD 12V
ALWAYS 5.8V
GND
POWER UP(L)
ALWAYS 12V
TO PW-A
CN254
AF SW PULSE
GND
PB AF
1.4M 1.8M AF REC
GND
SWD 5V
TO VP-1 CN291
CN253
HP LCH OUT
GND
HP RCH OUT
SWD 5V
H.P.CTL
TO TM-2 CN794
B2510 2SA1346 SWITCH
AF SW P
LP H
TO VD-A
B2509 2SC3399 SWITCH
IC232 M5236L REG.
Q2502 2SB544F REG.
Q2503 2SC4483S REG.
D2510 1SS133
D2509 MTZ5.1B
B2403 DTC343TK H.P.MUTE(R)
IC233 NJM4556S H.P.BUFFER
AD-1
CN203
NORM IN
GND
NORM OUT
LP H
A.REC MUTE H
SWD 12V
B2512 2SA1346 SWITCH
D2513 1SS133
B2506 2SC3399 SWITCH
FO 1.4M ADJ.
BPF ADJ
VR251 10K
VR239 5K
B2303 DTC343TK H.P.MUTE(L)
B2505 2SC3399 SWITCH
B2514 2SC3399 SWITCH
SWD-5V
L PB
R PB.
FO 1.8M ADJ.
VR252 10K
AUDIO LIMITER
LIMITER
DEMOD
HOLD PULSE
SW PULSE DELAY
AUTO LIMITER
ALC DET
NORMAL MIX HIFI
HIFI MIX NORMAL
HIFI/MIX/NOR
MUTE
VR
LPF
BPF
CCA
PEAK DET
WE FILTER
NP FILTER
FM FILTER
V-I CONV
D2512 1SS133
CN202
PB H
REC H
GND
BIAS(HOT)
BIAS(COLD)
TP201
TP202
R2542 10K
R2541 4.7K
VOLTAGE : REC(PLAY) MODE
7
8
9
10
11
12
13
14
15
16
17
18

OARD NORMAL AUDIO CIRCUIT DIAGRAM

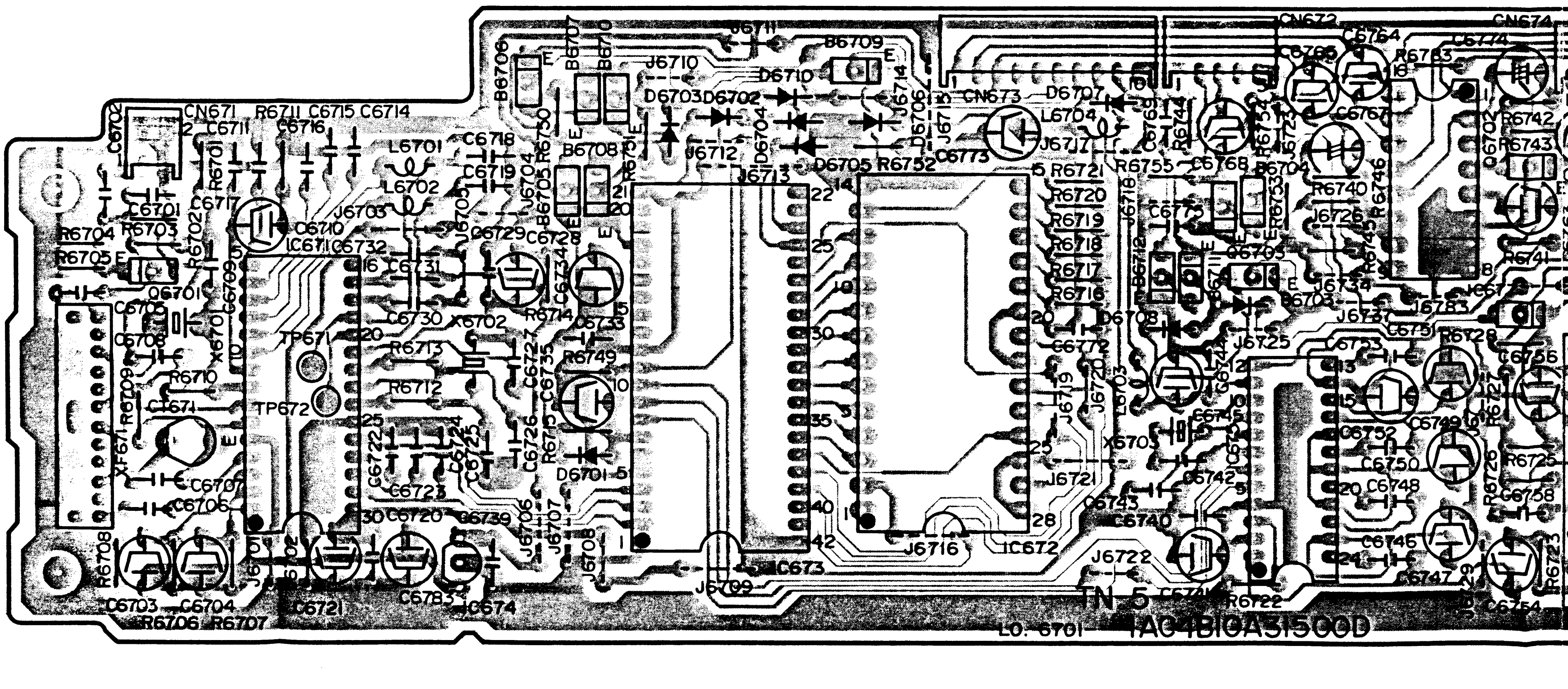

SWD 12V
ALWAYS 5.8V
GND
POWER UP(L)
ALWAYS 12V
TO PW-A
CN254
AF SW PULSE
GND
PB AF
1.8M 1.8M AF REC
GND
SWD 5V
TO VP-1 CN291
CN253
HP LCH OUT
GND
HP RCH OUT
SWD 5V
H.P.CTL
TO TM-2 CN794
B2510 2SA1346 SWITCH
AF SW P
LP H
TO VD-A
B2509 2SC3399 SWITCH
IC232 M5236L REG.
R2537 33K
R2535 15K
R2236 4.3K
Q2502 2SB544F REG.
R2534 220
C2518 100/16
C2517 0.033
D2515
C2615 0.01
C2514 47/16
Q2503 2SC4483S REG.
C2520 47/10
C2521 1000P
R2539 430
D2510 1SS133
D2509 MTZ5.1B
R2416 2.2K
B2403 DTC343TK H.P.MUTE(R)
IC233 NJM4556S H.P.BUFFER
R2418 27
C2419 220/6.3
R2028 22K
B2506 2SC3399 SWITCH
C2319 220/6.3
R2315 27
R2316 2.2K
B2303 DTC343TK H.P.MUTE(L)
R2545 10K
B2505 2SC3399 SWITCH
B2514 2SC3399 SWITCH
CN203
NORM IN
GND
NORM OUT
LP H
A.REC MUTE H
SWD 12V
AD-1
C2008 4700P
R2092 5.1K
R2091 6.2K
C2002 820P
R2003 120
C2072 1/50
R2006 2.7K
R2071 120
C2004 33/6.3
R2004 390K
R2009 3.3M
C2009 47/6.3
L2003 560μ
C2025 0.022
C2071 820P
R2002 2.7K
R2010 10K
R2011 9.1K
IC201 LA7294 NORMAL AUDIO R/P
CURRENT PROTECTOR
RIPPLE FILTER
REC/EE CONT.
PB/EE CONT
MUTING CONT
EP SW CONT
LP SW CONT
POWER ON/OFF MUTE
PB MUTE
ALC
ALC DET
R2019 18K
C2018 4.7/25
C2017 33/16
C2075 4.7/25
R2072 10K
C2016 1/50
R2012 4.3K
C2073 0.039
R2013 1K
C2010 10/16
R2014 1.8K
C2013 0.022
L2002 10μ
R2018 18K
D2001 1SS133
CN202
PB H
REC H
GND
BIAS(HOT)
BIAS(COLD)
TP201
TP202
R2001 100
R2021 10
T2001
Q2001 2SD734E,F BIAS OSC
C2020 220P
VR201 100K
C2021 0.033/100
C2022 0.01
R2022 47
C2019 47/16
R2023 15K
C2024 0.01
R2024 2.2
CN201
GND
R/P HEAD
R/P HEAD
FE.AE HEAD
GND
TO MECHANISM
VOLTAGE : REC(PLAY) MODE
VOLTAGE : REC(PLAY) MODE
12
13
14
15
16
17
18
19
20
21
22
23

TN-5 BOARD NICAM DECODER CIRCUIT DIAGRAM



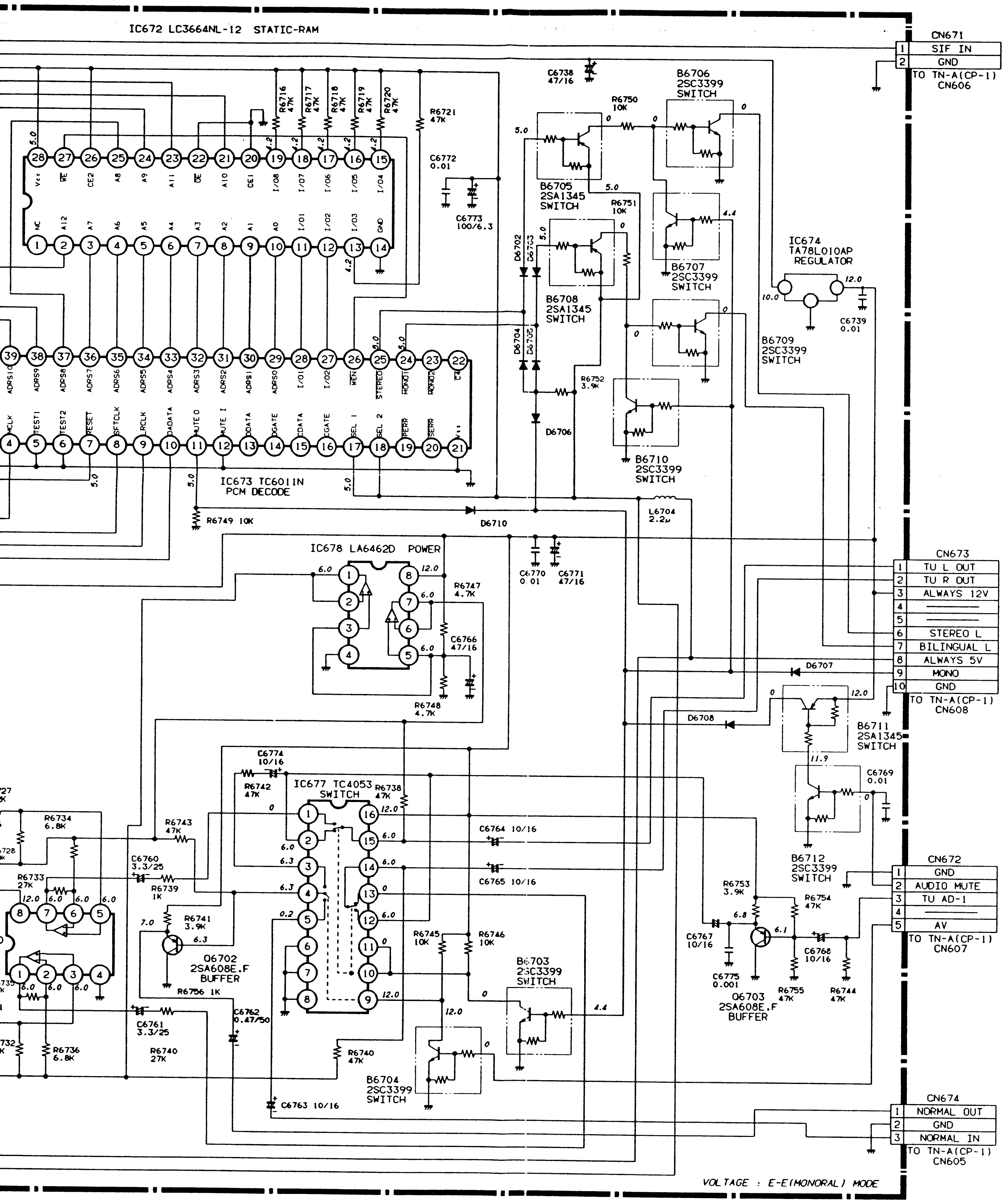
IC672 LC3664NL-12 STATIC-RAM
IC671 TA8662N QPSK
IC673 TC6011N PCM DECODE
IC675 TD6710AN DAC
IC678 LA6462D POWER
IC676 LA6462D AMP
IC677 TC4053 SWITCH
XF672 14K LPF
XF673 14K LPF
Q6701 2SC536E.F AMP
Q6702 2SA608E.F BUFFER
B6704 2SC3399 SWITCH
X6701 5.85M
X6702 5.824M
X6703 16.93M
XF671 5.85M
L6701 820μ
L6702 820μ
L6703 2.2μ
TP671
TP672
D6701
D6710
D6701-D6710: 1SS133 OR GMA01
TN-5
CDU1-11917 /SP

TN-5 P.C.B.

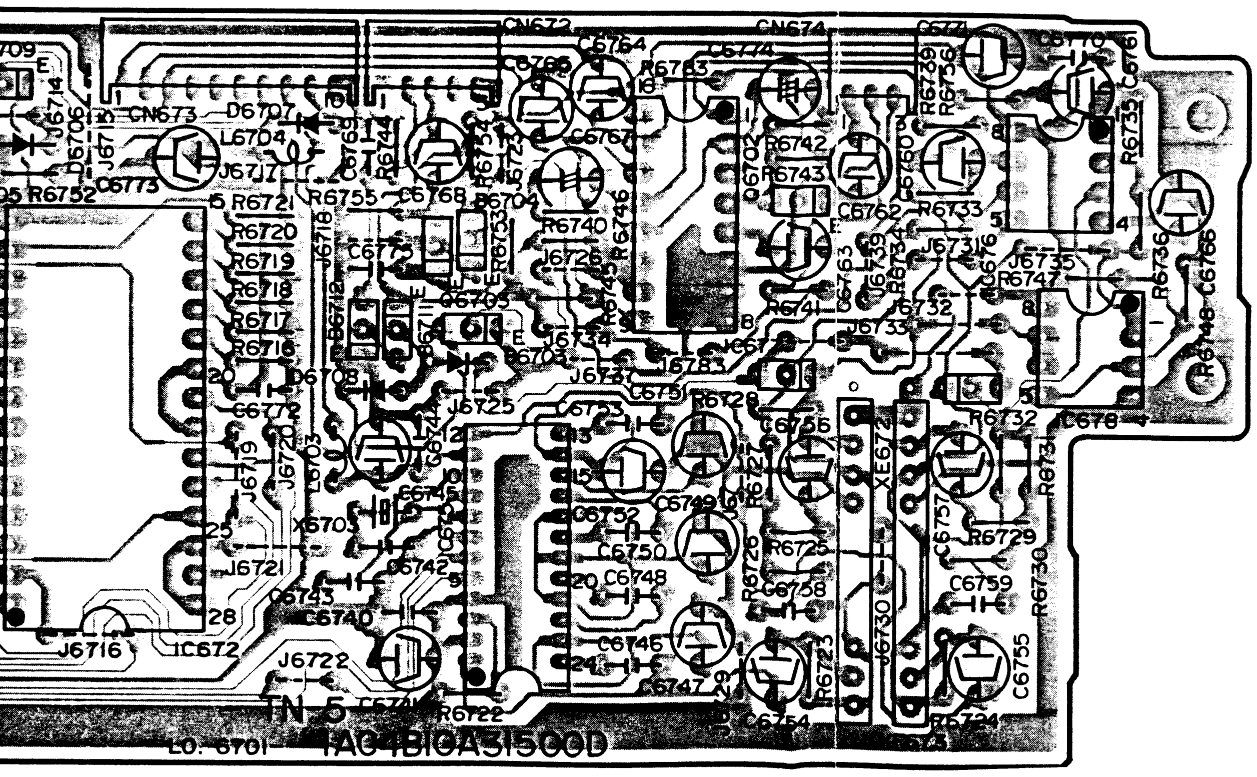


CN671
CN672
CN673
CN674
IC671
IC672
IC673
IC674
TP671
TP672
TN-5
LO. 6701
1A04B10A31500D

ICAM DECODER CIRCUIT DIAGRAM

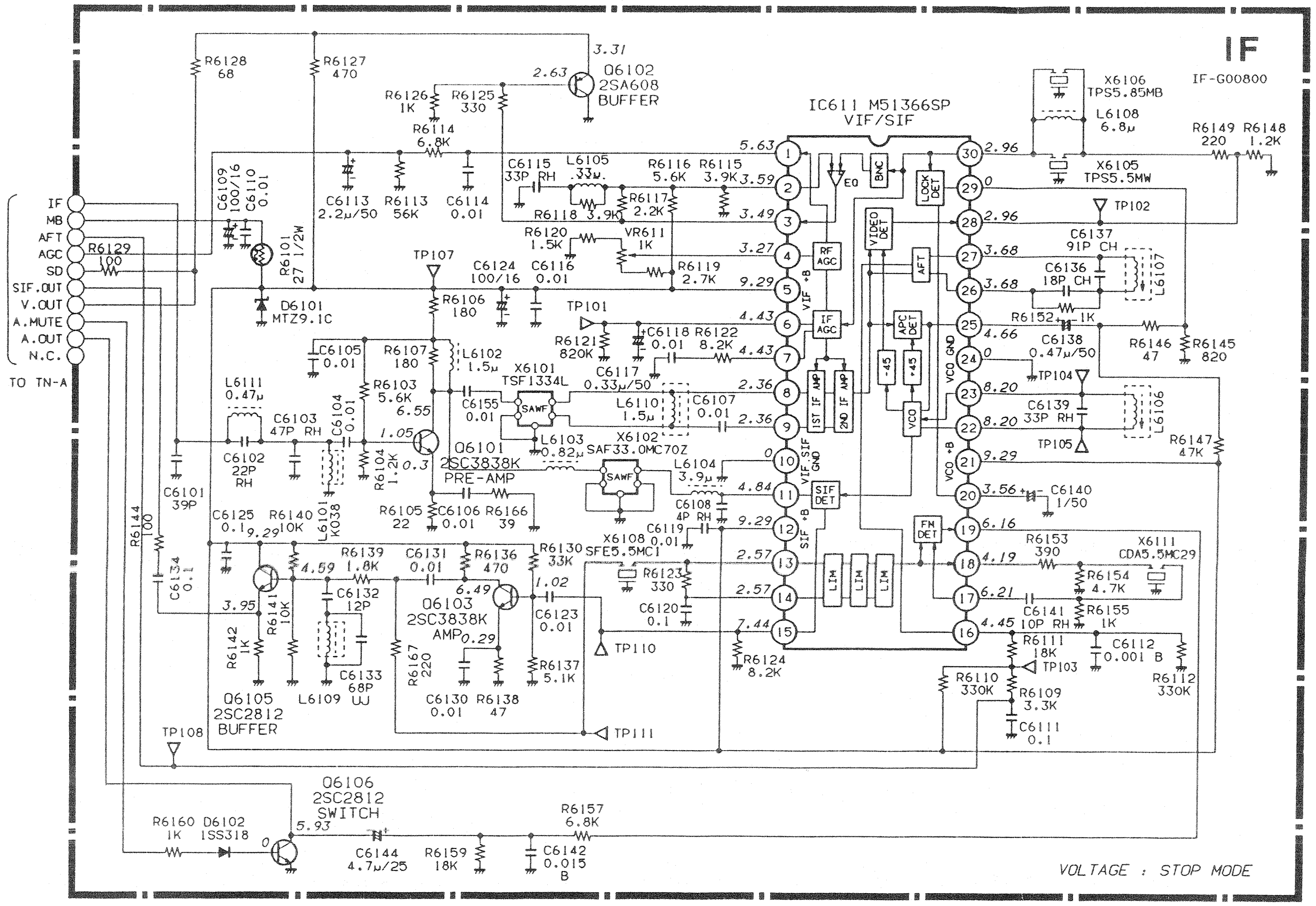

IC672 LC3664NL-12 STATIC-RAM
IC673 TC6011N PCM DECODE
IC678 LA6462D POWER
IC677 TC4053 SWITCH
IC674 TA78L010AP REGULATOR
B6705 2SA1345 SWITCH
B6706 2SC3399 SWITCH
B6707 2SC3399 SWITCH
B6708 2SA1345 SWITCH
B6709 2SC3399 SWITCH
B6710 2SC3399 SWITCH
B6711 2SA1345 SWITCH
B6712 2SC3399 SWITCH
B6703 2SC3399 SWITCH
B6704 2SC3399 SWITCH
Q6702 2SA608E.F BUFFER
Q6703 2SA608E.F BUFFER
CN671
1 SIF IN
2 GND
TO TN-A(CP-1) CN606
CN673
1 TU L OUT
2 TU R OUT
3 ALWAYS 12V
6 STEREO L
7 BILINGUAL L
8 ALWAYS 5V
9 MONO
10 GND
TO TN-A(CP-1) CN608
CN672
1 GND
2 AUDIO MUTE
3 TU AD-1
5 AV
TO TN-A(CP-1) CN607
CN674
1 NORMAL OUT
2 GND
3 NORMAL IN
TO TN-A(CP-1) CN605
VOLTAGE : E-E(MONORAL) MODE

TN-5 P.C.B.

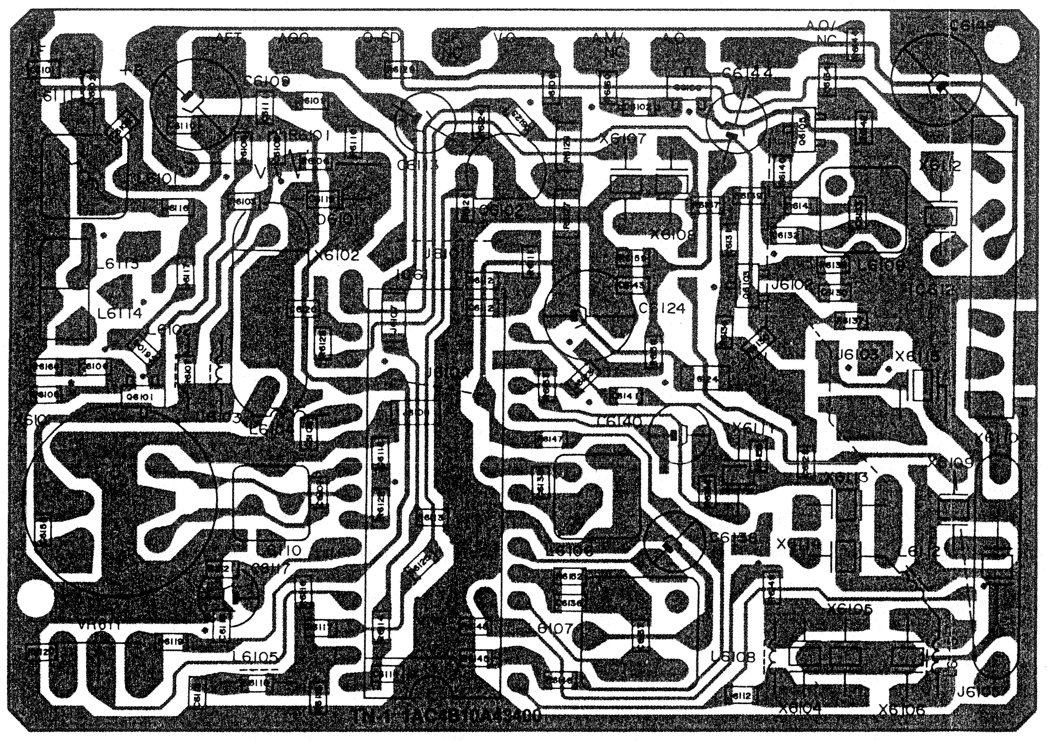

TN-5
IC672
1AC4B1GA31500D

12 13 14 15 16 17 18 19 20 21 22 23

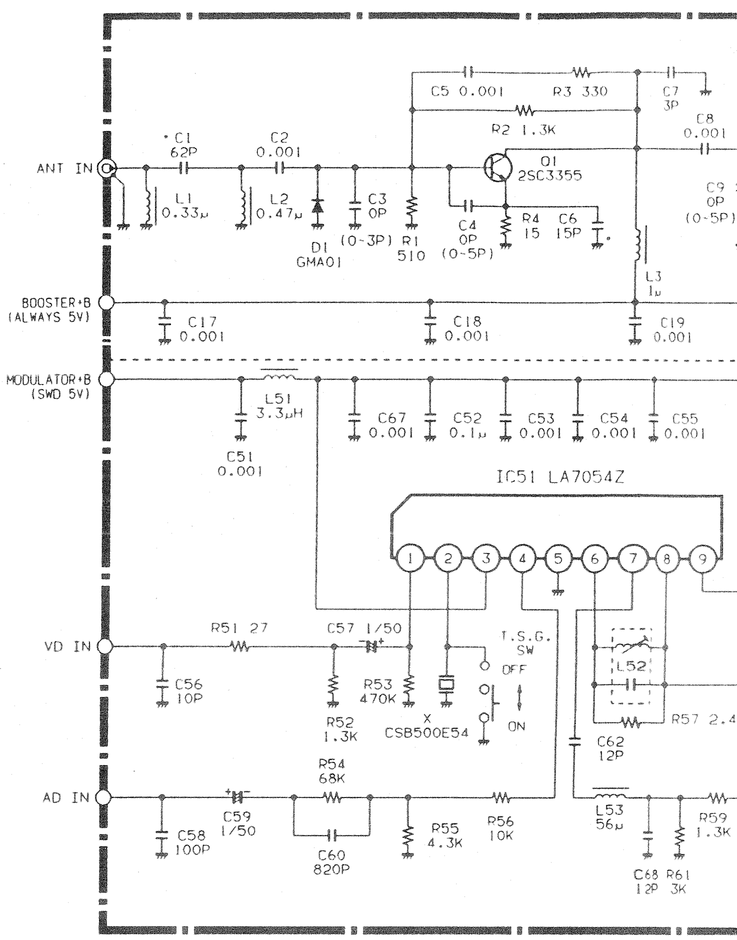
IF CIRCUIT DIAGRAM


IF
IF-G00800
IC611 M51366SP
VIF/SIF
Q6102
2SA608
BUFFER
Q6101
2SC3838K
PRE-AMP
Q6103
2SC3838K
AMP
Q6105
2SC2812
BUFFER
Q6106
2SC2812
SWITCH
X6106
TPS5.85MB
X6105
TPS5.5MW
X6101
TSF1334L
X6102
SAF33.0MC70Z
X6108
SFE5.5MC1
X6111
CDA5.5MC29
D6101
MTZ9.1C
D6102
1SS318
VR611
1K
RF AGC
IF AGC
VIDEO DET
AFT
LOCK DET
APC DET
VCO
1ST IF AMP
2ND IF AMP
SIF DET
FM DET
LIM
EQ
BNC
IF
MB
AFT
AGC
SD
SIF.OUT
V.OUT
A.MUTE
A.OUT
N.C.
TO TN-A
TP101
TP102
TP103
TP104
TP105
TP107
TP108
TP110
TP111
VOLTAGE : STOP MODE

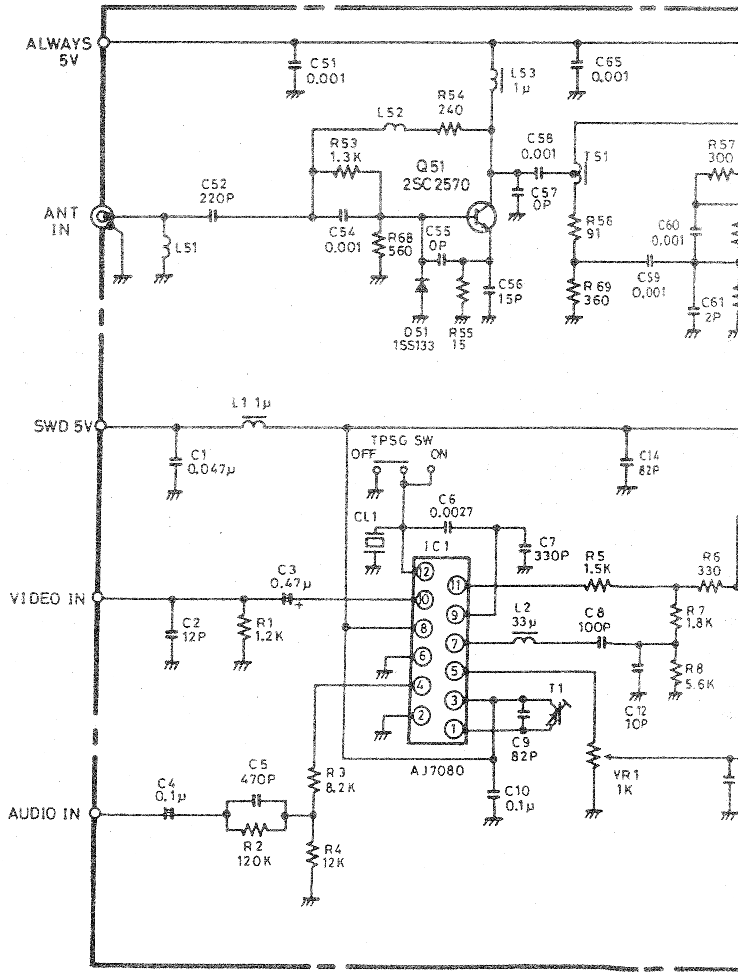
IF P.C.B.

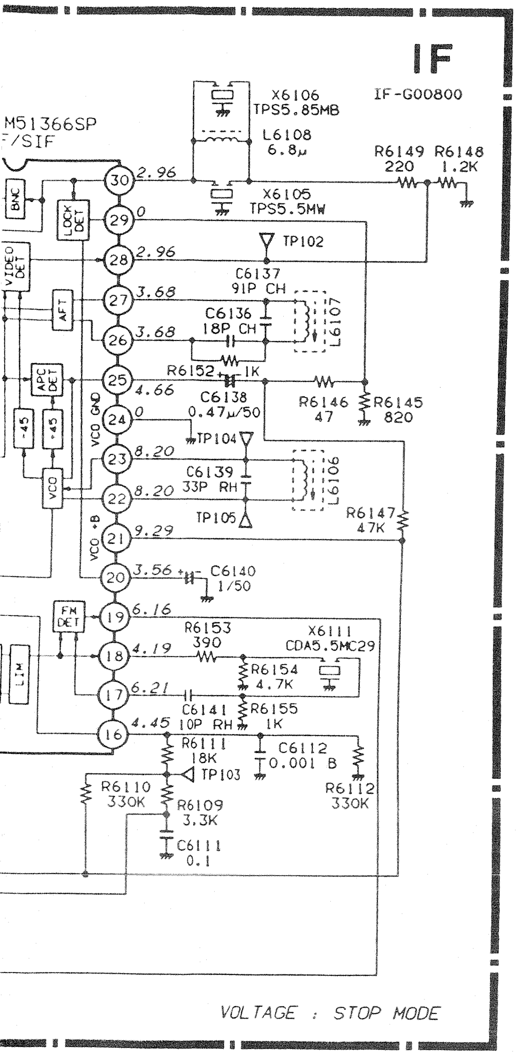

AFT
AGC
SD
VO
AM
AO
AO/NC
+B
IF
Q6101
Q6102
Q6103
Q6105
Q6106
X6101
X6102
X6105
X6106
X6107
X6108
X6111
L6105
L6108
L6113
L6114
VR611
C6124
C6140
C6144
J6105
TN-1 1AC4B10A02400

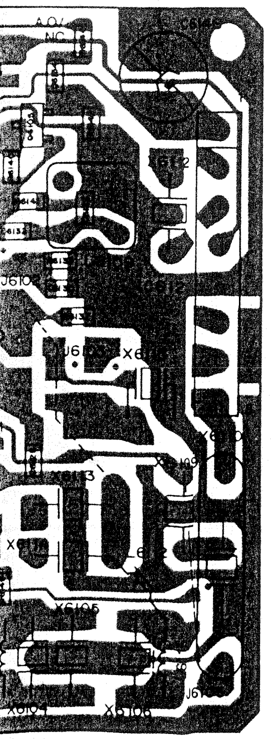
RF CONVERTER CIR


ANT IN
BOOSTER+B (ALWAYS 5V)
MODULATOR+B (SWD 5V)
VD IN
AD IN
Q1
2SC3355
D1
GMA01
IC51 LA7054Z
L51 3.3μH
I.S.G. SW
OFF
ON
X CSB500E54

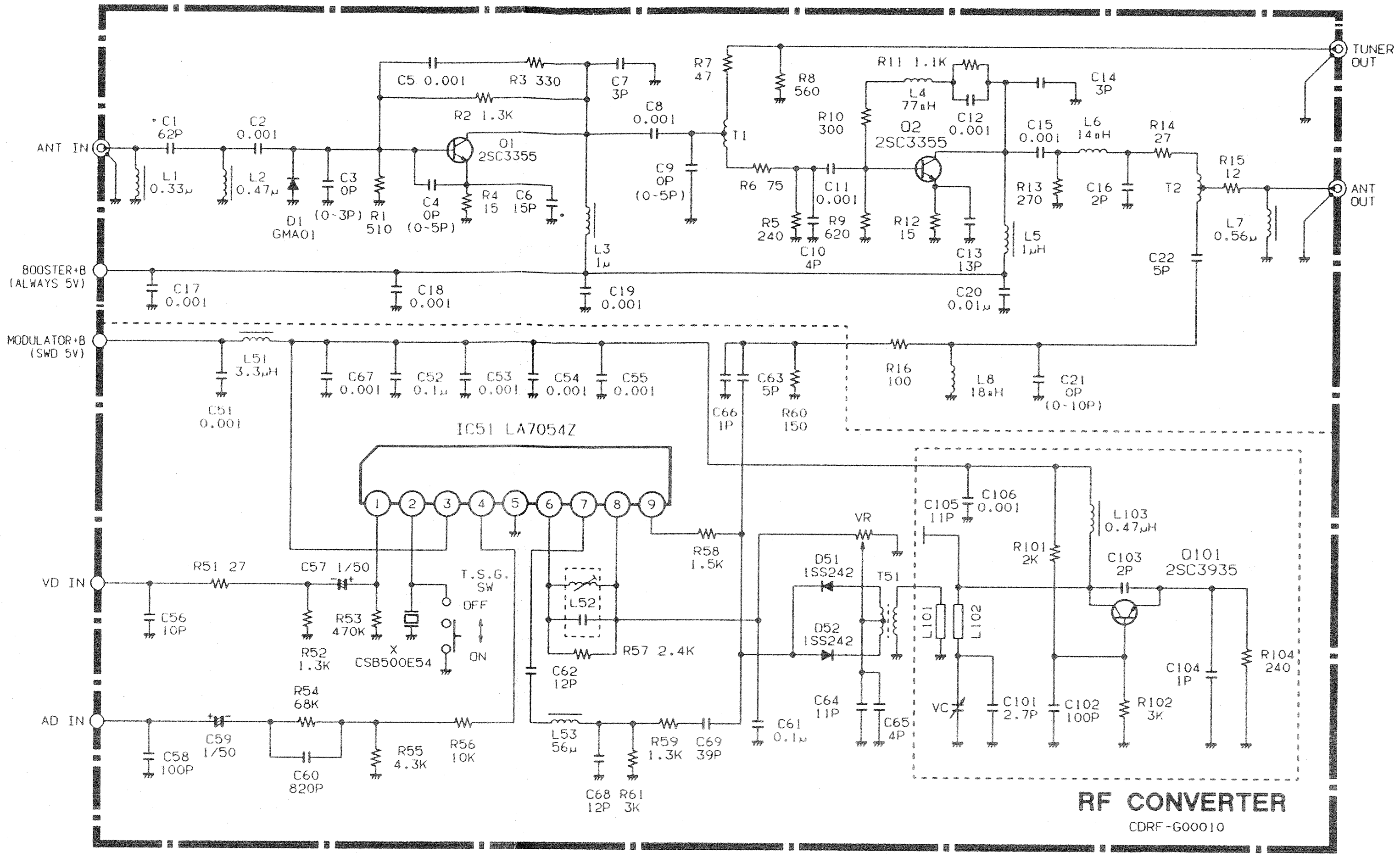
Note: Either one of these RF converters, type CDRF-G00010 or CDRF-G00370 is used, depending on availability.


ALWAYS 5V
ANT IN
SWD 5V
VIDEO IN
AUDIO IN
Q51
2SC2570
D51
1SS133
TPSG SW
OFF
ON
IC1
AJ7080
CL1
T1
VR1 1K
L1 1μ
L2 33μ

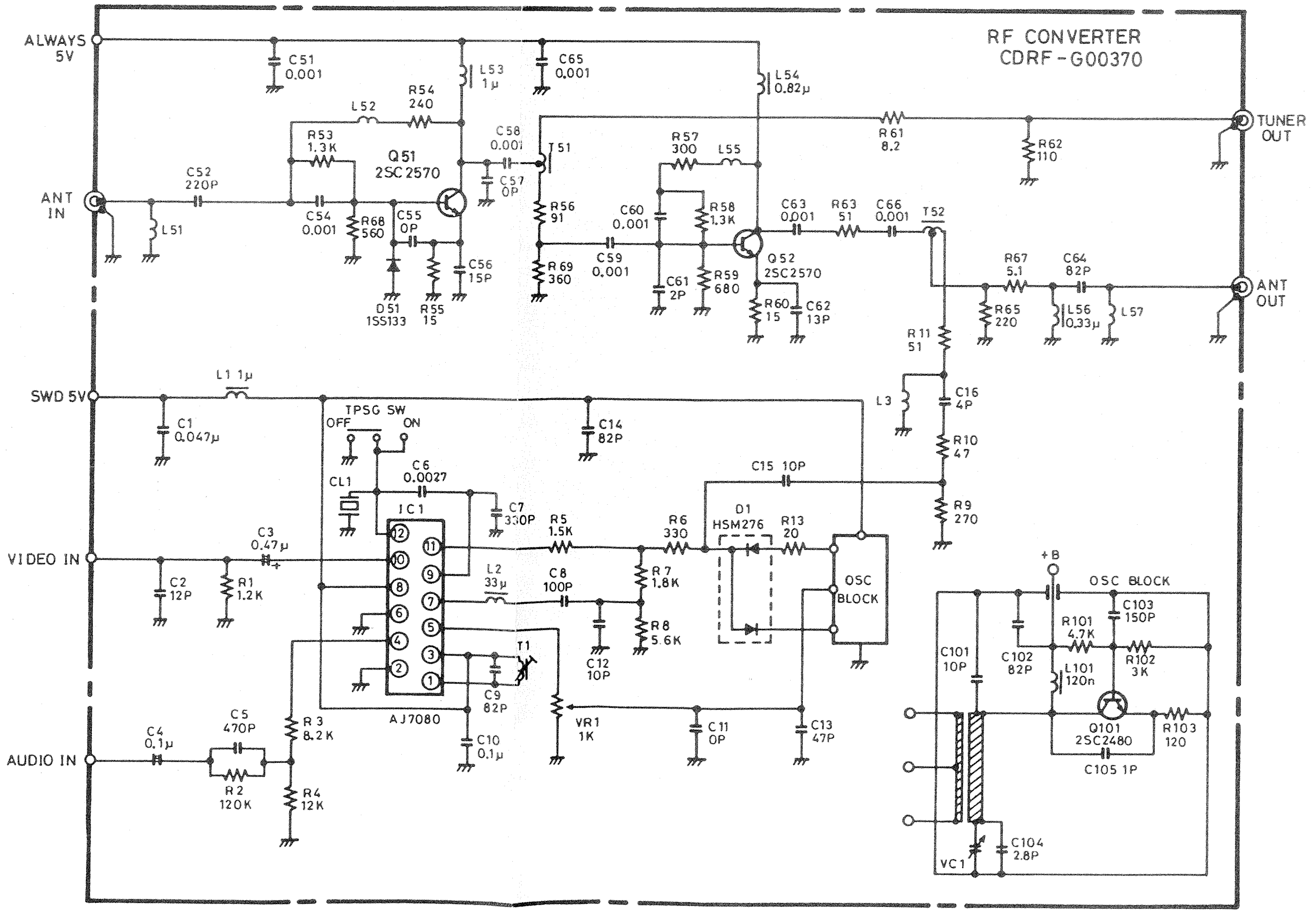

IF
IF-G00800
M51366SP
/SIF
X6106 TPS5.85MB
L6108 6.8μ
X6105 TPS5.5MW
R6149 220
R6148 1.2K
TP102
C6137 91P CH
C6136 18P CH
L6107
R6152 1K
C6138 0.47μ/50
R6146 47
R6145 820
TP104
C6139 33P RH
L6106
R6147 47K
TP105
C6140 1/50
R6153 390
X6111 CDA5.5MC29
R6154 4.7K
C6141 10P RH
R6155 1K
R6111 18K
C6112 0.001 B
TP103
R6110 330K
R6109 3.3K
R6112 330K
C6111 0.1
VOLTAGE : STOP MODE



RF CONVERTER CIRCUIT DIAGRAM


ANT IN
BOOSTER+B (ALWAYS 5V)
MODULATOR+B (SWD 5V)
VD IN
AD IN
TUNER OUT
ANT OUT
C1 62P
L1 0.33μ
C2 0.001
L2 0.47μ
D1 GMA01
C3 0P (0-3P)
R1 510
C4 0P (0-5P)
C5 0.001
R3 330
R2 1.3K
Q1 2SC3355
R4 15
C6 15P
C7 3P
C8 0.001
C9 0P (0-5P)
L3 1μ
R7 47
R8 560
T1
R11 1.1K
L4 77nH
C12 0.001
C14 3P
R10 300
Q2 2SC3355
C15 0.001
L6 14nH
R14 27
R6 75
C11 0.001
R5 240
R9 620
C10 4P
R12 15
C13 13P
L5 1μH
R13 270
C16 2P
T2
R15 12
L7 0.56μ
C22 5P
C17 0.001
C18 0.001
C19 0.001
C20 0.01μ
L51 3.3μH
C51 0.001
C67 0.001
C52 0.1μ
C53 0.001
C54 0.001
C55 0.001
C63 5P
C66 1P
R60 150
R16 100
L8 18nH
C21 0P (0-10P)
IC51 LA7054Z
R58 1.5K
VR
D51 1SS242
T51
D52 1SS242
C105 11P
C106 0.001
L103 0.47μH
R101 2K
C103 2P
Q101 2SC3935
L101
L102
R104 240
C104 1P
VC
C101 2.7P
C102 100P
R102 3K
C64 11P
C65 4P
C61 0.1μ
R51 27
C56 10P
C57 1/50
R53 470K
T.S.G. SW
OFF
ON
X CSB500E54
R52 1.3K
L52
R57 2.4K
C62 12P
R54 68K
C59 1/50
C58 100P
C60 820P
R55 4.3K
R56 10K
L53 56μ
R59 1.3K
C69 39P
C68 12P
R61 3K
RF CONVERTER
CDRF-G00010

Note: Either one of these RF converters, type CDRF-G00010 or CDRF-G00370 is used, depending on availability.


RF CONVERTER
CDRF-G00370
ALWAYS 5V
ANT IN
SWD 5V
VIDEO IN
AUDIO IN
TUNER OUT
ANT OUT
C51 0.001
L53 1μ
C65 0.001
L54 0.82μ
L52
R54 240
R53 1.3K
Q51 2SC2570
C58 0.001
C57 0P
C52 220P
L51
C54 0.001
R68 560
C55 0P
C56 15P
D51 1SS133
R55 15
T51
R56 91
R69 360
C60 0.001
C59 0.001
R57 300
L55
R58 1.3K
C61 2P
R59 680
Q52 2SC2570
R60 15
C62 13P
C63 0.001
R63 51
C66 0.001
T52
R61 8.2
R62 110
R67 5.1
C64 82P
R65 220
L56 0.33μ
L57
R11 51
L3
C16 4P
R10 47
R9 270
L1 1μ
C1 0.047μ
TPSG SW
OFF
ON
C14 82P
CL1
C6 0.0027
IC1
C7 330P
R5 1.5K
R6 330
D1 HSM276
R13 20
C15 10P
OSC BLOCK
C3 0.47μ
C2 12P
R1 1.2K
L2 33μ
C8 100P
R7 1.8K
R8 5.6K
C12 10P
T1
C9 82P
AJ7080
VR1 1K
C11 0P
C13 47P
C10 0.1μ
C4 0.1μ
C5 470P
R2 120K
R3 8.2K
R4 12K
+B
C103 150P
R101 4.7K
R102 3K
C101 10P
C102 82P
L101 120n
Q101 2SC2480
R103 120
C105 1P
C104 2.8P
VC1

IC301 (μPD75512GF) SYSTEM CONTROL MPU PIN FUNCTIONS TABLE

NO.	Name	I/O	I/O Signal Function
1	TAPE END.S	I	Sensor signal input for tape end detection.
2	A/D REF	I	Reference voltage input for internal A/D conversion circuit. (5 Vdc)
3	VDD		IC power supply input. (5 Vdc)
4	VDD		IC power supply input. (5 Vdc)
5	NOISE ADVANCE P.	O	Pulse for noise band advance in STILL mode.
6	INSERT HIGH	O	"HIGH" output in video signal insert mode. (Models equipped with FE heads.)
7	AF REC	O	"HIGH" output in video signal insert mode, signal to activate FE head.
8	A.DUB	O	"HIGH" output in audio dubbing mode.
9	AUDIO SEL.R	O	Output select signal for stereo audio signals. (ST/L/R/NORMAL).
10	AUDIO SEL.L		
11	INPUT SEL.V	O	Signal for selecting video input signal. (TUNER/EXTERNAL/S.C.)
12	INPUT SEL.A	O	Signal for selecting audio input signal. (TUNER/EXTERNAL/S.C.)
13	–	–	
14	BIAS CONTROL	O	Signal for switching full-width erasing head OFF when "HIGH" and ON when "LOW".
15	A REC MUTE	O	Signal to disable output or recording of NORMAL audio.
16	A MUTE	O	Signal to disable audio signal output.
17	NORMAL/$\overline{\text{S-VHS}}$	I	NORMAL (VHS) /S-VHS selection terminal. Normal VHS when "HIGH".
18	$\overline{\text{SV S.DATA}}$	O	Outputs 8-bit × 4 serial data giving operation mode and tracking data, etc., to digital servo IC. CLK is its clock pulse.
19	$\overline{\text{SV S.CLK}}$		
20	4K-PWM	O	Outputs 4 kHz PWM signal for set period at start of high-speed FF/REW.
21	REV HIGH	O	Signal giving skew correction in LP SEARCH mode. (PAL models only)
22	–	–	
23	VD REC	O	Signal indicating recording of video signal in insert mode. (Models equipped with FE head only)
24	–	–	
25	VISS $\overline{\text{ON}}$/OFF	I	VISS function ON/OFF terminal. VISS function enabled when "LOW".
26	SPECIAL PLAY	O	Output in special playback modes (R/L-SEARCH, × 2S, STILL, SLOW, F-ADVANCE, A-DUB PAUSE).
27	REC	O	Recording indication signal.
28	$\overline{\text{STILL + SLOW}}$	O	"LOW" output in STILL/SLOW mode for control on-screen IC.
29	ANT/$\overline{\text{VIDEO}}$	O	Antenna through or video deck RF output select (Video when LOW).
30	P.B. HIGH	O	Signal indicating playback image output.
31	FF + REW	O	"HIGH" output during FF or REW mode.
32	POWER UP	O	"HIGH" output except when power is off. Indicates that power is ON.
33	GND		IC ground terminal.
34	$\overline{\text{SAFETY SW}}$	I	Input terminal for accidental erasure prevention switch. No operating to recording mode while "LOW" is input.
35	$\overline{\text{SW DATA 3}}$	I	3-bit signal indicating operation position of mechanism.
36	$\overline{\text{SW DATA 2}}$		
37	$\overline{\text{SW DATA 1}}$		
38	–	–	Pull-up (5 Vdc)
39	FL START SW	I	Switch input indicating start of cassette loading or discharge by front mechanism.
40	–	–	
41	–	–	
42	AV CONTROL (8PIN)	O	AV terminal (21 PIN SOCKET) control signal output.
43	ATR SMPL P	O	Sampling pulse output during auto-tracking operation. (For ATR evaluation)
44	MC-BR	O	Brake signal for capstan motor.
45	MC-F/R	O	Indication signal for capstan motor rotation direction.
46	NOISE PULL OUT ON/$\overline{\text{OFF}}$	I	NOISE PULL OUT function ON/OFF terminal. Function enabled when "HIGH".
47	C-FG P.	I	FG pulse input for capstan motor. Signal with frequency of approximately 1 kHz is recognized.
48	T.REEL P.	I	Pulse input for detection of take-up reel table rotation.
49	CTL P.(0/1 CLK)	I	CTL head recording/playback pulse signal input.
50	S.REEL P.	I	Pulse input for detection of supply reel table rotation.
51	$\overline{\text{SSB DATA}}$	I/O	Terminals for communication of mode data with other microprocessors. Data is 8-bit × 12 block serial data. The clock pulse is output from this microcomputer.
52	$\overline{\text{SSB CLK}}$	O	
53	RF SW P.	I	Input of RF switching pulse created by head drum PG.
54	GND	–	IC ground terminal.
55	GND	–	Not used (grounded)
56	–	–	Not used
57	GND	–	IC ground terminal.
58	X1	–	IC clock OSC terminal. Clock frequency is 4 MHz.
59	X2	–	
60	$\overline{\text{RESET}}$	I	Initial reset terminal for IC. Reset when "LOW".
61	0/1 DATA	I	CTL head recording/playback pulse signal input. Used for VISS data detection.
62	ATR $\overline{\text{ON}}$/OFF	I	Auto tracking operation ON/OFF indication signal input. ATR ON when LOW.
63	ENV SW (DOC P.)	I	Video head envelope selection signal input. Used for absorbing (DOC PULSE) STILL noise.
64	–	–	Input terminal for external pause switch.
65	LP HIGH	O	"HIGH" output when tape speed is set to LP mode.
66	LP V-MUTE	O	"HIGH" video mute signal output when in set to LP mode.
67	–	–	
68	–	–	
69	ML-M	O	Loading motor rotational speed (medium speed) indication signal.
70	ML-L	O	Loading motor rotational speed (low speed) indication signal.
71	ML-R	O	Loading motor rotational direction (REV) indication signal.
72	ML-F	O	Loading motor rotational direction (FWD) indication signal.
73	GND	–	IC ground terminal.
74	JPN/US/PAL	I	Terminal to alter internal specifications for destination areas. (0V input for SP only models, 0.6V input for SP/LP models.)
75	TAPE SPEED	I	Input of result of tape speed determination by digital servo IC.
76	OEM OPTION	I	Terminal to alter internal specifications. (0V input)
77	Hi-Fi ENV	I	AF head envelope detection signal input. (Used for ATR of Hi-Fi models)
78	ENV	I	Video head envelope detection signal input. (Used for ATR)
79	DEW S.	I	Dew sensor input terminal.
80	TAPE TOP S.	I	Sensor signal input for tape beginning detection.

P75512-0

IC351 (LC7417) DIGITAL SERVO IC PIN FUNCTIONS TABLE

Pin No.	I/O Terminal Name	I/O	Input/Output Function
1	ROTARY	O	Outputs the head switching control signal for 4-head and 3-head models.
2	H-AMP-SW	O	
3	RF-SW-PULSE	O	Video head switching pulse output.
4	AF-SW-PULSE	O	Audio head (FM) switching pulse output.
5	DL1	I	Dummy V_D insertion position control CR.
6	DL2	I	Dummy V_D insertion position control terminal.
7	CTL-IN	I	Control signal input.
8	REMAK	O	Outputs the control signal re-recording control signal. Three-value output (H, M, L).
9	REC-CTL	O	Recording control signal output. Three-value output (H, OPEN, L).
10	D-P	O	Outputs the drum compensation pulse in the slow mode.
11	D-PG. MM	I	CR for drum PG signal delay.
12	D-PG	I	Drum PG signal input.
13	D-FG	I	Drum FG signal input.
14	DSE	O	Outputs the speed error for drum system speed control. An output making the drum motor stop is delivered when DRUM-ON is "0". The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
15	FHE	O	Outputs the horizontal sync signal of the composite sync signal after F-V conversion (using the drum phase control system). The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
16	DPE		Error output for drum system phase control. The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
17	C-P	O	Outputs the capstan compensation pulse in the slow mode.
18	C-START/STP	O	Outputs the capstan motor start and brake pulses in the slow mode.
19	V_{DD}		+ 5V ± 10%
20	CSE	O	Capstan system speed error output. An output making the capstan motor stop is delivered when CAP-ON is "0". The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
21	CPE	O	Capstan system phase reciprocal error output. The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
22	$\overline{\text{F}}$/R	O	Capstan motor forward/reverse control output. "1" sets the reverse mode, and "0" the forward mode.
23	C-FG1	I	Capstan FG signal input.
24	C-FG2	I	2nd capstan FG signal input. Used for stop detection in the intermittent slow mode.
25	EP/LP/SP	O	Recording mode output. Three-value output ("H" is for EP mode, "M" for LP mode and "L" for SP mode).
26	$\overline{\text{SP}}$	O	Recording mode output. "L" is for SP mode.
27	SP	O	Recording mode output. "H" is for SP mode.
28	MC-BR	I	Control input for capstan brake timing.
29	SLOW-TRK-CR	I	CR for slow tracking adjustment.
30	TRK-CR	I	CR for tracking adjustment.
31	D-PH	I	CR for drum compensation timing adjustment in the slow mode.
32	D-WD1	I	
33	D-WD2	I	
34	REF-TRK	O	Outputs the tracking delay input signal.
35	SLOW/STILL	O	Internal mode signal output. "H" in the slow mode.
36	MODE (× 2+STILL)	O	Mode decoding signal output. At the × 2 SPEED mode and starting time of SLOW/STILL mode, output "H" level.
37	INDEX-CLK	O	Outputs the timing for the control signal duty detector.
38	INDEX-DATA	O	Outputs the control signal duty detection results.
39	SV-S • CLK	I	Serial transmission clock pulse input.
40	SV-S • DATA	I	Serial data input terminal.
41	NTSC/$\overline{\text{PAL}}$	I	NTSC/PAL switching input. "H" is for NTSC, "L" for PAL.
42	REF	O	Outputs the internal reference signal.
43	V_{DD}		+ 5V supply terminal
44	FSC IN	I	Input for the IC internal system clock pulse. A level of at least 0.3 Vp-p is required. The color subcarrier signal is input by capacitive coupling.
45	V_{SS}		Ground
46	C-SYNC	I	Composite sync signal input.
47	ENV SW	I	Head selection signal (PB envelope detection signal) input for 4-head special playback.
48	VD	O	Dummy V_D signal output.

LC7418

IC711 (M50

Pin No.	Port
1	Vcc
2	$P6_5$
3	$P6_4$
4	$P6_3$
5	$P6_2$
6	$P6_1$
7	$P6_0$/T
8	$P2_7$
9	$P2_6$
10	$P2_5$
11	$P2_4$
12	$P2_3$
13	$P2_2$
14	$P2_1$
15	$P2_0$
16	$P3_7$/$\overline{\text{Srdy}}$
17	$P3_6$/CLK
18	$P3_5$/Sout
19	$P3_4$/Sin
20	$P3_3$/ANin
21	$P3_2$/CNTR
22	$P3_1$
23	$P3_0$
24	$P5_3$/INT_1
25	$P5_2$/INT_2
26	CNVss
27	$\overline{\text{RESET}}$
28	Xin
29	Xout
30	Xcin
31	Xcout
32	Vss
33	ϕ
34	$P5_7$
35	$P5_6$
36	$P5_5$
37	$P5_4$
38	Vp
39	$P5_1$
40	$P5_0$
41	$P1_7$
42	$P1_6$
43	$P1_5$
44	$P1_4$
45	$P1_3$
46	$P1_2$
47	$P1_1$
48	$P1_0$
49	$P0_7$
50	$P0_6$
51	$P0_5$
52	$P0_4$
53	$P0_3$
54	$P0_2$
55	$P0_1$
56	$P0_0$
57	$P4_7$
58	$P4_6$
59	$P4_5$
60	$P4_4$
61	$P4_3$
62	$P4_2$
63	$P4_1$
64	$P4_0$

NOTE : Clock frequency

1. Connect the anode
and the cathode to
($\overline{\text{RESET}}$) terminal on
2. The clock frequency
terminal of Pin 7 a
3. In order to set norm
of Pin 27 ($\overline{\text{RESET}}$)
removing the diode

P75512-0

IC351 (LC7417) DIGITAL SERVO IC PIN FUNCTIONS TABLE

Pin No.	I/O Terminal Name	I/O	Input/Output Function
1	ROTARY	O	Outputs the head switching control signal for 4-head and 3-head models.
2	H-AMP-SW	O	
3	RF-SW-PULSE	O	Video head switching pulse output.
4	AF-SW-PULSE	O	Audio head (FM) switching pulse output.
5	DL1	I	Dummy V_D insertion position control CR.
6	DL2	I	Dummy V_D insertion position control terminal.
7	CTL-IN	I	Control signal input.
8	REMAK	O	Outputs the control signal re-recording control signal. Three-value output (H, M, L).
9	REC-CTL	O	Recording control signal output. Three-value output (H, OPEN, L).
10	D-P	O	Outputs the drum compensation pulse in the slow mode.
11	D-PG. MM	I	CR for drum PG signal delay.
12	D-PG	I	Drum PG signal input.
13	D-FG	I	Drum FG signal input.
14	DSE	O	Outputs the speed error for drum system speed control. An output making the drum motor stop is delivered when DRUM-ON is "0". The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
15	FHE	O	Outputs the horizontal sync signal of the composite sync signal after F-V conversion (using the drum phase control system). The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
16	DPE		Error output for drum system phase control. The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
17	C-P	O	Outputs the capstan compensation pulse in the slow mode.
18	C-START/STP	O	Outputs the capstan motor start and brake pulses in the slow mode.
19	V_{DD}		+ 5V ± 10%
20	CSE	O	Capstan system speed error output. An output making the capstan motor stop is delivered when CAP-ON is "0". The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
21	CPE	O	Capstan system phase reciprocal error output. The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
22	$\overline{\text{F}}$/R	O	Capstan motor forward/reverse control output. "1" sets the reverse mode, and "0" the forward mode.
23	C-FG1	I	Capstan FG signal input.
24	C-FG2	I	2nd capstan FG signal input. Used for stop detection in the intermittent slow mode.
25	EP/LP/SP	O	Recording mode output. Three-value output ("H" is for EP mode, "M" for LP mode and "L" for SP mode).
26	$\overline{\text{SP}}$	O	Recording mode output. "L" is for SP mode.
27	SP	O	Recording mode output. "H" is for SP mode.
28	MC-BR	I	Control input for capstan brake timing.
29	SLOW-TRK-CR	I	CR for slow tracking adjustment.
30	TRK-CR	I	CR for tracking adjustment.
31	D-PH	I	CR for drum compensation timing adjustment in the slow mode.
32	D-WD1	I	
33	D-WD2	I	
34	REF-TRK	O	Outputs the tracking delay input signal.
35	SLOW/STILL	O	Internal mode signal output. "H" in the slow mode.
36	MODE (× 2+STILL)	O	Mode decoding signal output. At the × 2 SPEED mode and starting time of SLOW/STILL mode, output "H" level.
37	INDEX-CLK	O	Outputs the timing for the control signal duty detector.
38	INDEX-DATA	O	Outputs the control signal duty detection results.
39	SV-S • CLK	I	Serial transmission clock pulse input.
40	SV-S • DATA	I	Serial data input terminal.
41	NTSC/$\overline{\text{PAL}}$	I	NTSC/PAL switching input. "H" is for NTSC, "L" for PAL.
42	REF	O	Outputs the internal reference signal.
43	V_{DD}		+ 5V supply terminal
44	FSC IN	I	Input for the IC internal system clock pulse. A level of at least 0.3 Vp-p is required. The color subcarrier signal is input by capacitive coupling.
45	V_{SS}		Ground
46	C-SYNC	I	Composite sync signal input.
47	ENV SW	I	Head selection signal (PB envelope detection signal) input for 4-head special playback.
48	VD	O	Dummy V_D signal output.

LC7418

IC711 (M50959) TIMER MPU PIN FUNCTIONS TABLE

Pin No.	Port	Input/Output Signal	I/O	Input/Output Function
1	Vcc			+ 5V
2	$P6_5$	TXD	O	DATA signal output to VIDEO TEXT (TELETEXT) MPU.
3	$P6_4$	RXD	I	DATA signal input from VIDEO TEXT (TELETEXT) MPU.
4	$P6_3$	PLL CLK	O	Signal input/output of CLOCK, DATA, CE (chip enable) for PLL tuning system IC.
5	$P6_2$	PLL DATA	I/O	
6	$P6_1$	PLL CE	O	
7	$P6_0$/T	ADJUST	O	Pulse output (32.768kHz/1024 = 32Hz) for clock frequency adjustment.
8	$P2_7$	$\overline{\text{CLK}}$	O	Clock pulse output to the E^2 PROM.
9	$P2_6$	DI	I/O	Data exchange with the E^2 PROM.
10	$P2_5$	$\overline{\text{E}^2\text{ PROM CS1}}$	O	E^2 PROM 1 is accessed when "L".
11	$P2_4$	$\overline{\text{BG}}$/L	O	Transmission system switching ("L" = PAL BG ; "H" = SECAM L).
12	$P2_3$	VIDEO MUTE	O	"H" output during VIDEO MUTE.
13	$P2_2$	TUNER ON	O	"H" output when power is ON and during VPS scanning.
14	$P2_1$	$\overline{\text{AUDIO MUTE}}$	O	"L" output during AUDIO MUTE.
15	$P2_0$	TEXT CLK	O	CLOCK signal output to VIDEO-TEXT (TELETEXT) MPU.
16	$P3_7$/$\overline{\text{Srdy}}$		–	
17	$P3_6$/CLK	$\overline{\text{S.CLK}}$	I	SSB clock pulse input.
18	$P3_5$/Sout	$\overline{\text{S.OUT}}$	O	SSB data output.
19	$P3_4$/Sin	S.IN	I	SSB data input.
20	$P3_3$/ANin	AFT.C	I	AFT.S curve input.
21	$P3_2$/CNTR	H.SYNC	I	Sync. detection signal input for existing channel discrimination. ("L" = Existing Sync.)
22	$P3_1$	SCL	O	Clock pulse output to the VPS decoder IC.
23	$P3_0$	SDA	I/O	Data exchange with the VPS decoder IC.
24	$P5_3$/INT_1	$\overline{\text{POWER DOWN}}$	I	Power failure mode set at "L" input.
25	$P5_2$/INT_2	IR SIG. IN	I	Remote control signal input.
26	CNVss			Ground.
27	$\overline{\text{RESET}}$			Reset terminal.
28	Xin			6MHz clock terminal.
29	Xout			
30	Xcin			32.768kHz (clock OSC used in the power failure mode)
31	Xcout			
32	Vss			Ground
33	ϕ			
34	$P5_7$	KEY IN4	I	Key inputs
35	$P5_6$	KEY IN3	I	
36	$P5_5$	KEY IN2	I	
37	$P5_4$	KEY IN1	I	
38	Vp	Vp		-30V
39	$P5_1$	STEREO R	O	2-bit signal output for AUDIO OUTPUT SELECT and audio output display indication according to table below.
40	$P5_0$	STEREO L	O	
41	$P1_7$	o	O	Display segment outputs. (Included key-scan output)
42	$P1_6$	n	O	
43	$P1_5$	m	O	
44	$P1_4$	l	O	
45	$P1_3$	k	O	
46	$P1_2$	j	O	
47	$P1_1$	i	O	
48	$P1_0$	G9	O	Display grid outputs.
49	$P0_7$	G8	O	
50	$P0_6$	G7	O	
51	$P0_5$	G6	O	
52	$P0_4$	G5	O	
53	$P0_3$	G4	O	
54	$P0_2$	G3	O	
55	$P0_1$	G2	O	
56	$P0_0$	G1	O	
57	$P4_7$	h	O	Display segment outputs. (Included key-scan output)
58	$P4_6$	g	O	
59	$P4_5$	f	O	
60	$P4_4$	e	O	
61	$P4_3$	d	O	
62	$P4_2$	c	O	
63	$P4_1$	b	O	
64	$P4_0$	a	O	

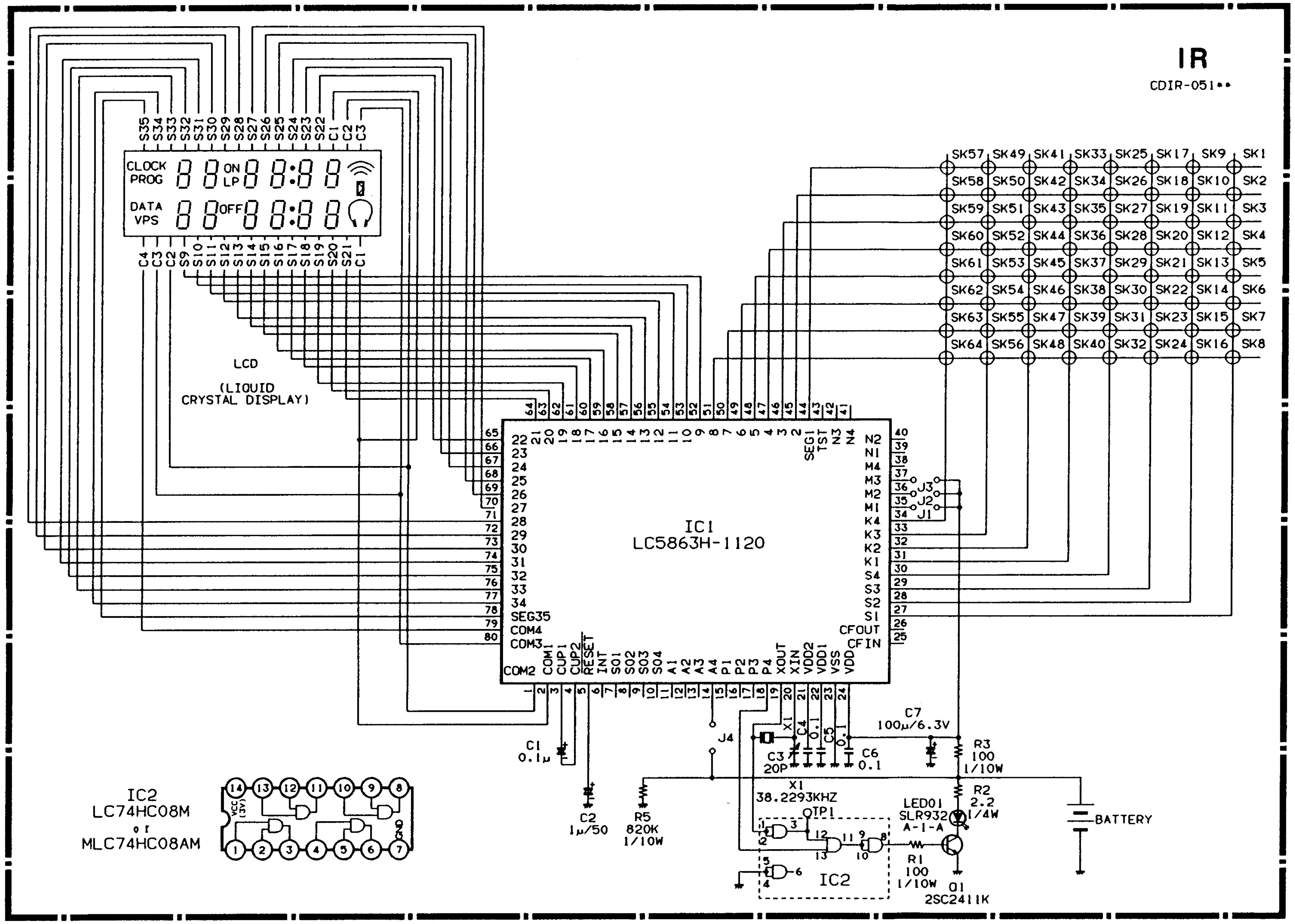
NOTE : Clock frequency check with ADJUST terminal of Pin 7.

1. Connect the anode of the diode (IS188 etc.) to Pin 44 (key-scan l) and the cathode to Pin 37 (KEY IN 1). Then ground the Pin 27 ($\overline{\text{RESET}}$) terminal once and reset the microcomputer.
2. The clock frequency (32 Hz) can be observed with the ADJUST terminal of Pin 7 according to the servicing above.
3. In order to set normal function mode again, ground the terminal of Pin 27 ($\overline{\text{RESET}}$) once and reset the microcomputer after removing the diode connected to Pins 44 and 37.

PORT \ MODE	NORMAL	MAIN	SUB	STEREO
STEREO R (Pin 39)	L	L	H	H
STEREO L (Pin 40)	L	H	L	H

P50959F0

IR REMOTE CONTROL CIRCUIT DIAGRAM


IR
CDIR-051••
LCD
(LIQUID CRYSTAL DISPLAY)
CLOCK
PROG
DATA
VPS
ON
LP
OFF
S35 S34 S33 S32 S31 S30 S29 S28 S27 S26 S25 S24 S23 S22 C1 C2 C3
C4 C3 C2 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21 C1
IC1
LC5863H-1120
SEG35
COM4
COM3
COM2
COM1
CUP1
CUP2
RESET
INT
SO1 SO2 SO3 SO4
A1 A2 A3 A4
P1 P2 P3 P4
XOUT XIN VDD2 VDD1 VSS VDD
CFOUT
CFIN
S1 S2 S3 S4
K1 K2 K3 K4
M1 M2 M3 M4
N1 N2 N3 N4
TST
SEG1
J1 J2 J3
SK57 SK49 SK41 SK33 SK25 SK17 SK9 SK1
SK58 SK50 SK42 SK34 SK26 SK18 SK10 SK2
SK59 SK51 SK43 SK35 SK27 SK19 SK11 SK3
SK60 SK52 SK44 SK36 SK28 SK20 SK12 SK4
SK61 SK53 SK45 SK37 SK29 SK21 SK13 SK5
SK62 SK54 SK46 SK38 SK30 SK22 SK14 SK6
SK63 SK55 SK47 SK39 SK31 SK23 SK15 SK7
SK64 SK56 SK48 SK40 SK32 SK24 SK16 SK8
C1
0.1µ
C2
1µ/50
R5
820K
1/10W
J4
X1
C3
20P
C4
0.1
C5
0.1
C6
0.1
C7
100µ/6.3V
R3
100
1/10W
R2
2.2
1/4W
X1
38.2293KHZ
TP1
LED01
SLR932
A-1-A
R1
100
1/10W
Q1
2SC2411K
IC2
BATTERY
IC2
LC74HC08M
or
MLC74HC08AM
VCC (3V)
GND

AVAILABLE KEY FUNCTION OF REMOTE CONTROL UNIT

KEY NO.	FUNCTION		KEY NO.	FUNCTION		KEY NO.	FUNCTION	
1	PAUSE	USE	23	MARK		45	CHECK	USE
2	STOP	USE	24	CNT M	USE	46	CHSCAN	
3	MODE -		25	CH +	USE	47	OK	
4	REC	USE	26	0/AV	USE	48	M.STILL	
5			27	CH -	USE	49	3	USE
6	MODE +		28	A.SEL	USE	50	2	USE
7	SEARCH	USE	29	CANCEL	USE	51	1	USE
8	SLOW		30	←		52	VPS	
9	FF	USE	31	↑		53	PROG	USE
10	PLAY	USE	32	→		54	M.CALL	
11	BLANK	USE	33	9	USE	55	OSD	
12	REW	USE	34	8	USE	56	ERASE	
13	A.TR	USE	35	7	USE	57	TRANS	USE
14	C.DISP		36	SC	USE	58	ZOOM	
15	SPECIAL	USE	37	CLOCK	USE	59	MONITOR	USE
16	RESET	USE	38	SIZE		60	VCR/TV	
17	EJECT		39	ART		61	POWER	USE
18	R.PLAY		40	INST		62	PRESET	
19	X2S		41	6	USE	63	NR	
20	A.DUB		42	5	USE	64	MUTE	
21	INSERT		43	4	USE			
22	↓		44	SP/LP	USE			

IR-05132

SANYO

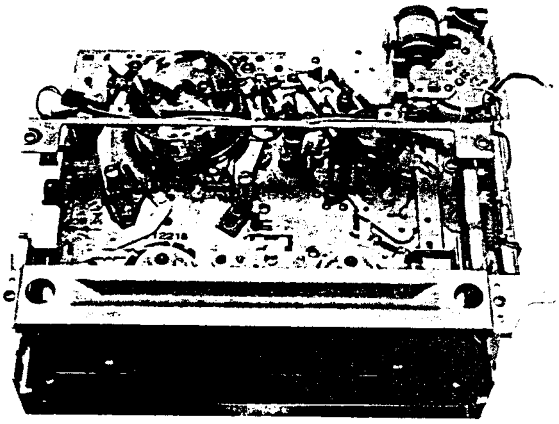
MECHANISM SERVICE TECHNICAL INFORMATION

FISHER

P90 MECHANISM

VIDEO
CASSETTE RECORDER

VHS HQ
PAL SECAM



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1. OUTLINE OF MECHANISM

This mechanism is named P-90 Mechanism. Its features include :

(1) The chassis is fabricated by drawing a 1.6mm thick electric zinc plated steel sheet, and mechanical parts are ingeniously laid on this chassis. The mechanism is as thick as 70.3 mm.

(2) After insertion of a cassette, the tape is normally wound to the head drum based on the full loading system. This design results in the shortening of the mode shift time, that is, the time from the depression of the PLAY pushbutton switch to the video image display on screen has been significantly quickened.

(3) The full loading system employed has the F/R search capability (when the same button (F.FWD or REW) is pressed in the F.FWD or REW modes, the search mode playback image appears on the screen).

(4) Also, a thin type head drum without lead is provided to increase the operating convenience of the equipment to a considerable extent.

(5) The drive source for cassette loading and the motor for the tape loading mode selection are used in combination with the head motor and the capstan motor for realization of a 3-motor system.

1-1. FULL LOADING MECHANISM

(1) Description of full loading mechanism
As shown in Fig. 1-1 a tape has hitherto been wound onto the head drum only in the PLAY and F/R SEARCH mode, but in this radically new mechanism, in every mode can be made with the tape kept wound onto the head drum.

(2) Features of full loading mechanism
With the provision of the full loading mechanism, the operating convenience, which was hitherto a drawback of the VHS system, has been improved. A host of other salient features are also designed into this mechanism as apparent from the following description.

I. Quick playback
Mode shift time such as the STOP→PLAY and FF/REW→PLAY has been shortened for quicker playback.

II. High-speed VISS
The time from the detection of VISS search signal based on the VHS standardized search system till image display on the screen has considerably been shortened to make high-speed VISS possible.

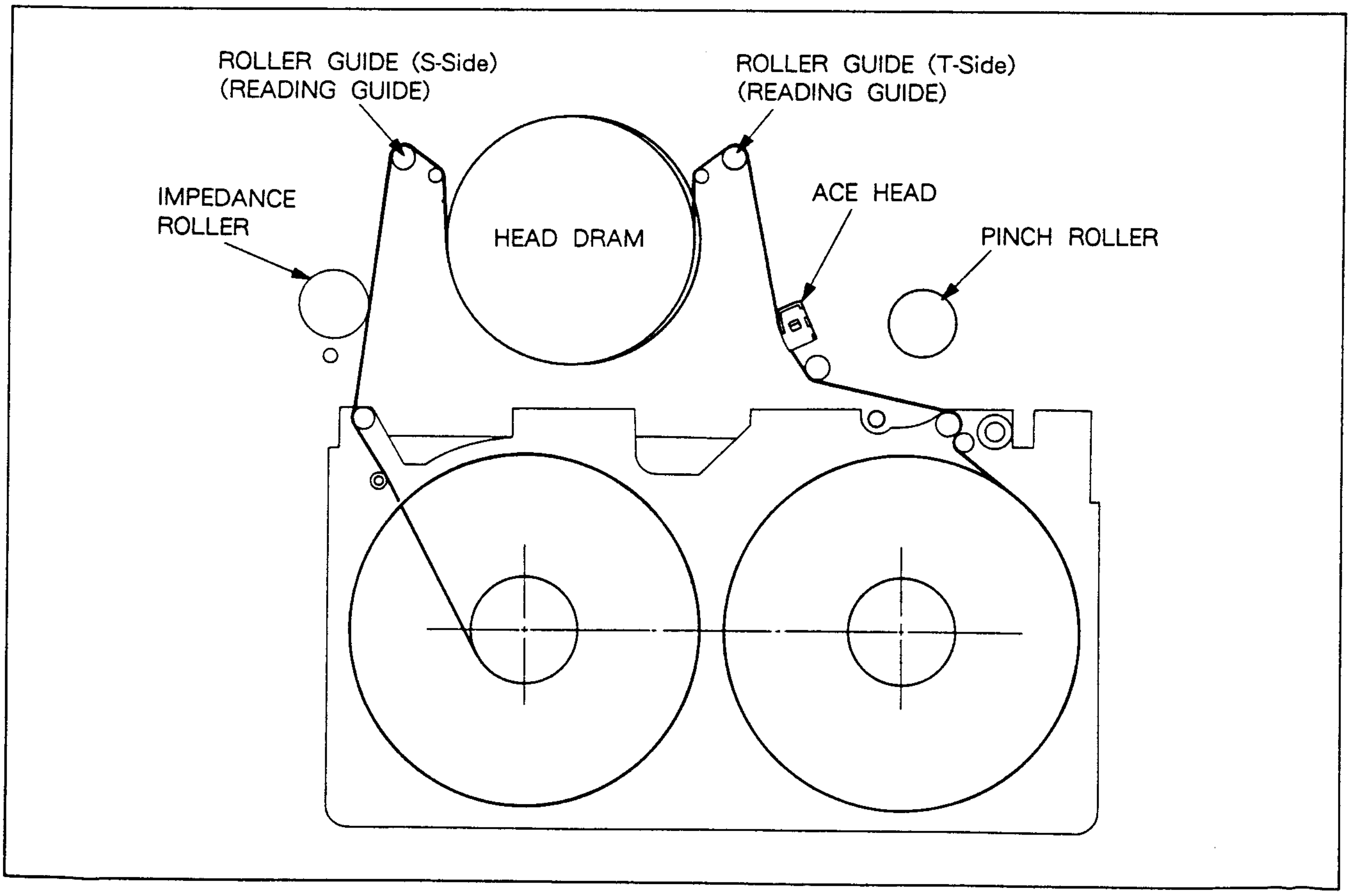


Fig. 1-1 FULL LOADING SYSTEM (AT FF/REW MODE)

III. F／R search
FF↔F-SEARCH and REW↔R-SEARCH can be made direct by reducing the mode transition time.

(3) Protection mechanism for full loading system

I. Video Tape Protection Mechanism

(a) FF／REW→STOP
Tape tension applied to the head drum when stopping is lowered by optimizing the balance between the left and right, and brake forces acting on the left and right reel table. Thereby it prevents from causing a scratch on the tape due to V-head when stopping.

(b) STOP→FF／REW
The starting-up speed of the capstan motor is ingeniously designed to preclude the possibility of unusual tape tension at the time of REW／FWD start-up.

(c) Tape end brake damping
The design of the mechanism is so made that the time from issuance of an electrical STOP command till actual brake application is reduced to a minimum. This enable the braking to be completed before the reader tape end.

(d) FF／REW running
To ensure highly stable tape running in any condition and any environment, design consideration is given to the foundation brake torque (soft brake) to the reel table and the tape winding angle with respect to each tape guide. Particularly in regard to the supply side fixing guide and F.T.E (Full Track Erase) head, the design is so made that they do not come into contact with the tape at the time of FF／REW operation to alleviate load application.

II. Final End Position Tape Loading Protection Mechanism
Tape pull-out (loading) from within the cassette is done to ensure proper take-up of the tape onto the head drum. At that time, the tape is extended from the supply reel side.
So, if the tape is wound to the final end, no loading can be made. For this reason, a mode is designed to allow the tape to be rewound a little at the final end of the tape without any loading done.

2. DESCRIPTION OF MECHANISM OPERATION

2-1. BASIC OPERATION MODE OF MECHANISM

The P-90 mechanism has its original modes such as given in Table 2-1, in addition to the VTR is operation modes (STOP, FF, REW, PLAY, REC, R-SEARCH, F-SEARCH, STILL, SLOW, and ETS). These modes specific to the mechanism play important roles in tape protection operation at the time of a shift to various modes of the VTR above. A shift to the mode specific to the mechanism is carried out by controlling the rotation of the loading motor with the control signal of the system control circuit. The detection of important mechanism operation mode positions is done by using the FL START SWITCH for detecting the cassette ejection/insertion, and the MECHANISM MODE SWITCH for detecting each mode of the mechanism (3 bit MODE DATA is output by operating the rotary switch).

Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	VTR Operation Mode
	3	2	1			
EJECT	–	–	–		Eject position	EJECT
					↕ Front loading/Unloading	
SHORT REW	–	–	–		Take up operation in the tape end position	Low side of ⑤. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position	Power off when tape is loaded completely
					Tape unloading position ↕ Tape loading Tape loading ending position	
BRAKE	0	0	1	①	Main brake applying position	
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)	STOP, FF/REW
STILL	0	1	1	③	The positions of STILL. SLOW or F-ADV.	STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode	PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position	PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode	R-SEARCH

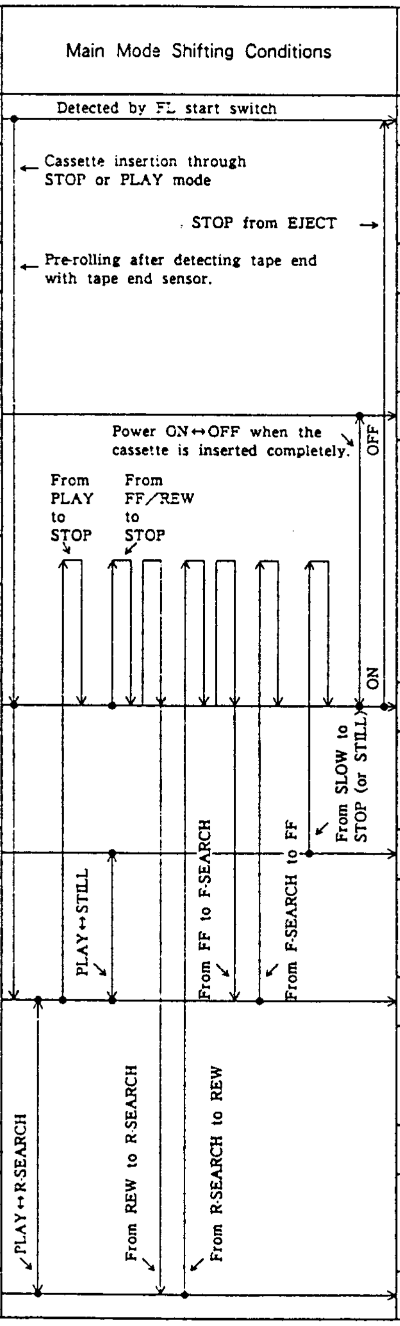

Main Mode Shifting Conditions
Detected by FL start switch
Cassette insertion through STOP or PLAY mode
STOP from EJECT
Pre-rolling after detecting tape end with tape end sensor.
Power ON↔OFF when the cassette is inserted completely.
OFF
ON
From PLAY to STOP
From FF/REW to STOP
From SLOW to STOP (or STILL)
PLAY↔STILL
From FF to F-SEARCH
From F-SEARCH to FF
PLAY↔R-SEARCH
From REW to R-SEARCH
From R-SEARCH to REW

Table 2-1

2-2. DESCRIPTION OF MECHANISM DRIVE

To realize the thin type mechanism, a loading motor and two pieces of cam (MAIN CAM GEAR and the MODE CAM GEAR) to be driven by the said motor are mounted on the upper part of the capstan motor, that was a dead space in the conventional mechanisms hitherto available with a view to optimization of parts mounting layout. (Fig. 2-1 and Fig. 2-2.)

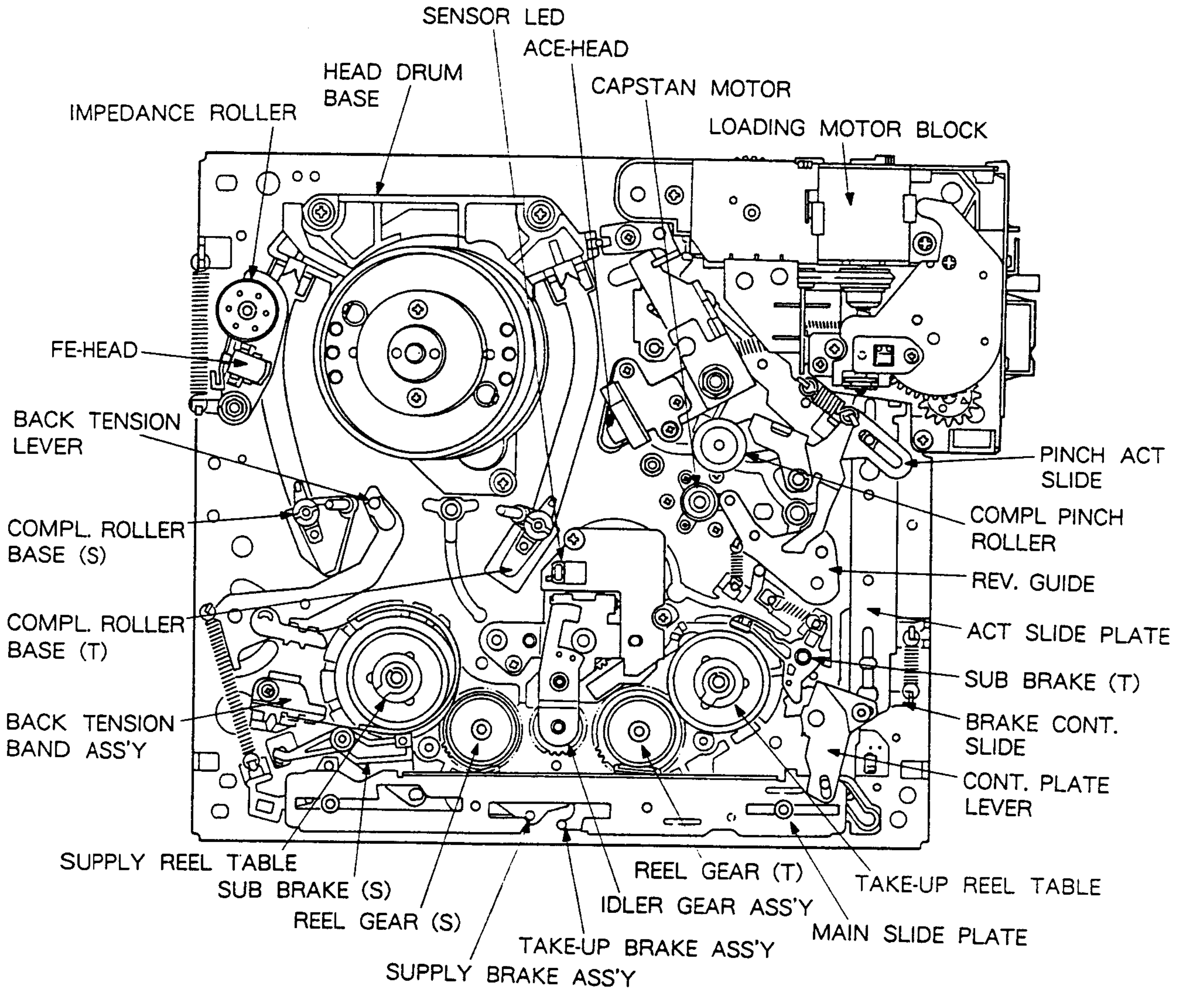

SENSOR LED
ACE-HEAD
HEAD DRUM BASE
CAPSTAN MOTOR
IMPEDANCE ROLLER
LOADING MOTOR BLOCK
FE-HEAD
BACK TENSION LEVER
PINCH ACT SLIDE
COMPL. ROLLER BASE (S)
COMPL PINCH ROLLER
REV. GUIDE
COMPL. ROLLER BASE (T)
ACT SLIDE PLATE
SUB BRAKE (T)
BACK TENSION BAND ASS'Y
BRAKE CONT. SLIDE
CONT. PLATE LEVER
SUPPLY REEL TABLE
SUB BRAKE (S)
REEL GEAR (T)
TAKE-UP REEL TABLE
IDLER GEAR ASS'Y
REEL GEAR (S)
MAIN SLIDE PLATE
TAKE-UP BRAKE ASS'Y
SUPPLY BRAKE ASS'Y
FRONT

Fig. 2-1 TOP VIEW OF MECHANISM (INITIAL MODE)

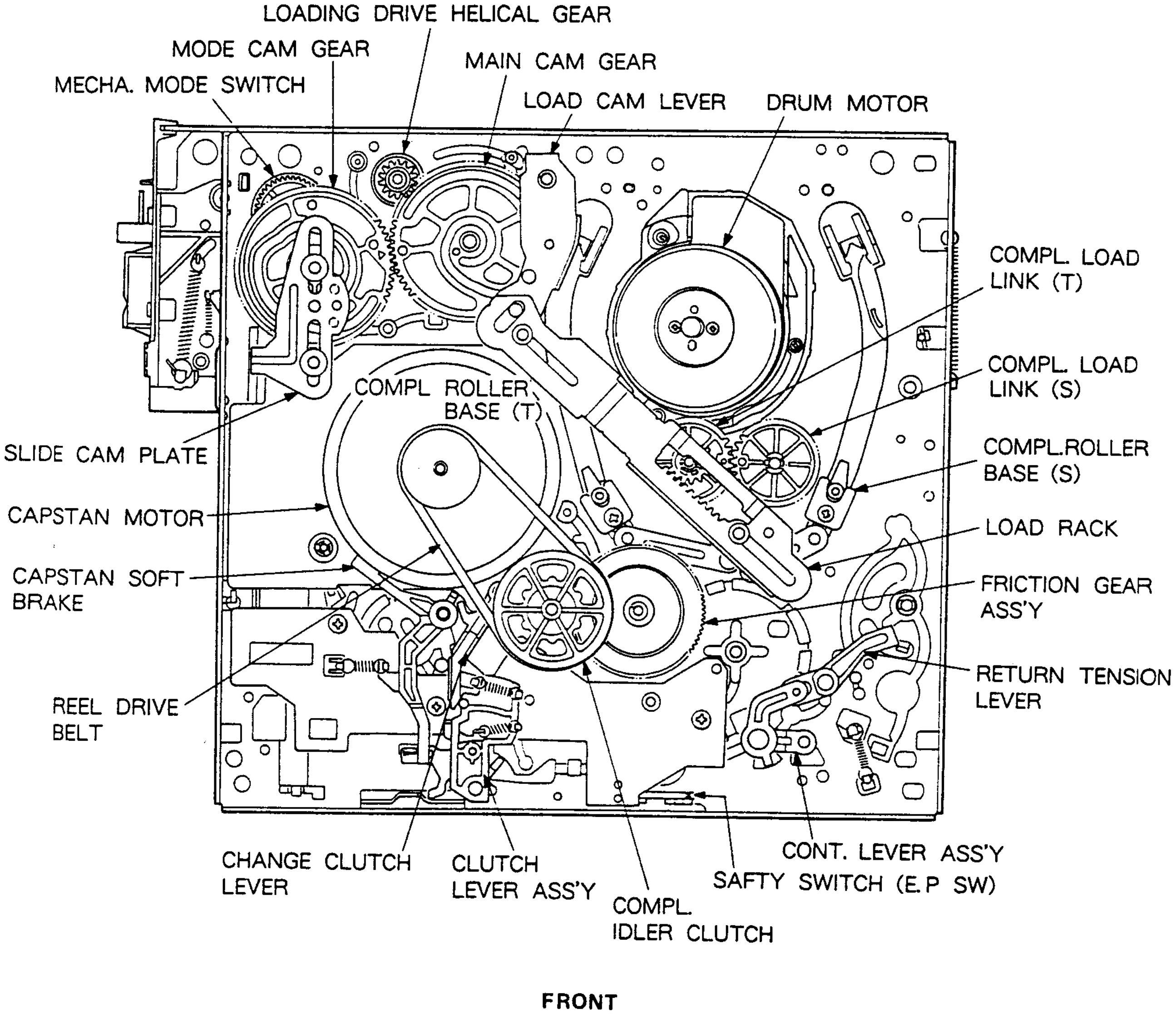

LOADING DRIVE HELICAL GEAR
MODE CAM GEAR
MECHA. MODE SWITCH
MAIN CAM GEAR
LOAD CAM LEVER
DRUM MOTOR
COMPL. LOAD LINK (T)
COMPL. LOAD LINK (S)
COMPL.ROLLER BASE (S)
LOAD RACK
FRICTION GEAR ASS'Y
RETURN TENSION LEVER
COMPL ROLLER BASE (T)
SLIDE CAM PLATE
CAPSTAN MOTOR
CAPSTAN SOFT BRAKE
REEL DRIVE BELT
CHANGE CLUTCH LEVER
CLUTCH LEVER ASS'Y
COMPL. IDLER CLUTCH
CONT. LEVER ASS'Y
SAFTY SWITCH (E.P SW)
FRONT

Fig. 2-2 BOTTOM VIEW OF MECHANISM (INITIAL MODE)

These two cams have one CAM GROOVE on both sides. A total of four CAM GROOVEs performs independent functions to meet the multi-function needs of these days by driving the elements of a wide variety of functions with the motor precisely controlled by a microcomputer.
The two cams are positive motion cams having a groove over 570 degrees. These cams cause the amount of lift to be changed by a mild gradient according to the angle of rotation while synchronizedly being rotated by an outer circumferential gear to alleviate the load exerted on the cams when driving the rod linked with the cams and also to ensure position stability in each mode of operation. The geometry of each cam and that of a metal fitting of the drive section are shown in Fig. 2-3 and Fig. 2-4, respectively. Also, the role of each cam used is described below.
On the GROOVE 3 side of MODE CAM GEAR have a small gear.
This small gear is engaged with the MECHANISM MODE SWITCH as shown in Fig. 2-3., and detect the mechanism operation mode. In this way, the two cams and the MECHANISM MODE SWITCH are rotated synchronously, and the mechanism is fully synchronized and driven for each mode.

MAIN CAM GEAR :	CAM GROOVE 1. Pinch roller pressing operation CAM GROOVE 2. Tape loading mechanical drive
MODE CAM GEAR :	CAM GROOVE 3. Brake and clutch selecting operation CAM GROOVE 4. Brake control and front unloading control

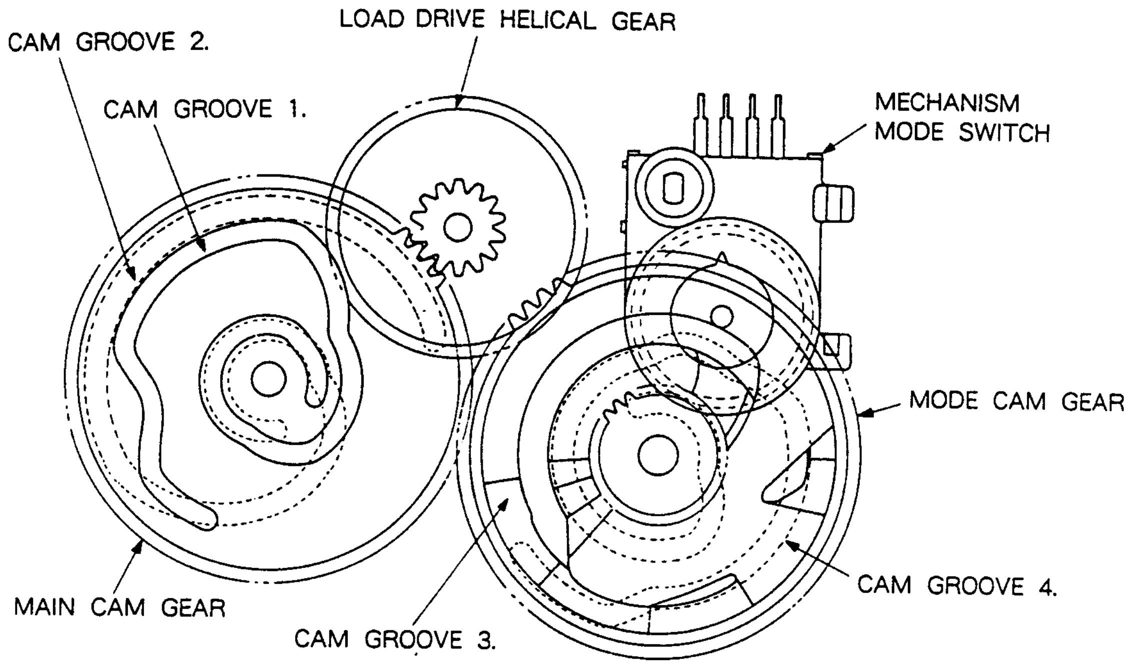


Fig. 2-3 PLAN OF CAMS CONSTRUCTION

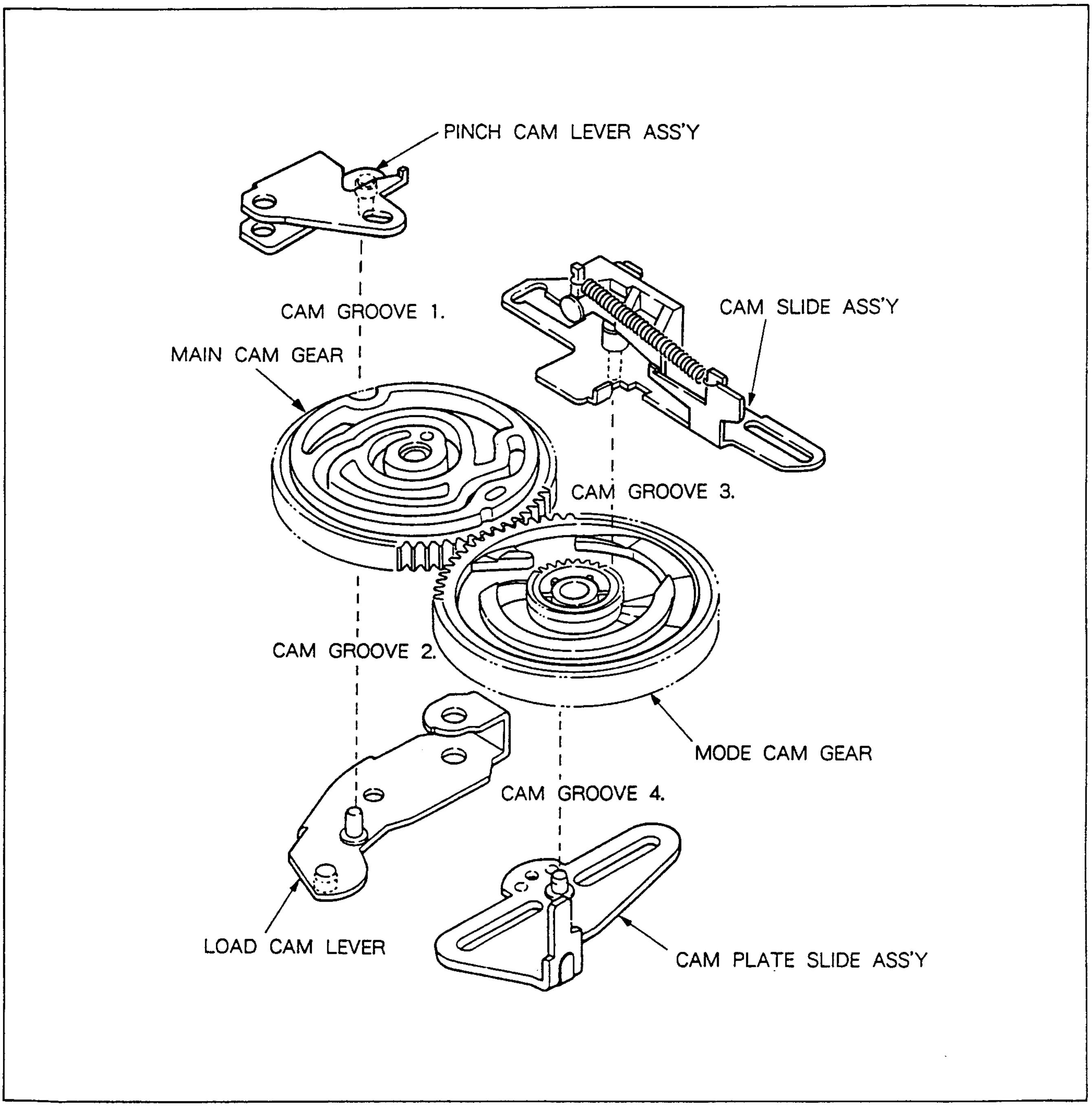

PINCH CAM LEVER ASS'Y
CAM SLIDE ASS'Y
CAM GROOVE 1.
MAIN CAM GEAR
CAM GROOVE 3.
CAM GROOVE 2.
MODE CAM GEAR
CAM GROOVE 4.
LOAD CAM LEVER
CAM PLATE SLIDE ASS'Y

Fig. 2-4 VIEW OF CAMS CONSTRUCTION

2-2-1. Tape Loading Mechanism

The tape loading mechanism is compactly designed with use of a LOAD RACK for loading by drive from the before-mentioned MAIN CAMs with CAM GROOVE 2. The LOAD RACK is laid on the dead space in between the DD capstan motor and the head motor for effective space utilization.(Fig. 2-5) The process from tape pull-out upon loading to contact of the leading guide section with the stopper of drum base and press-fitting under tension of spring is guided and driven in such a manner that the rod is drawn inward from the outer circumferential direction of the CAM GROOVE 2, thereby reducing the load torque (PV value) to the CAM GROOVE. And, the load of the loading motor is minimized to enhance reliability.

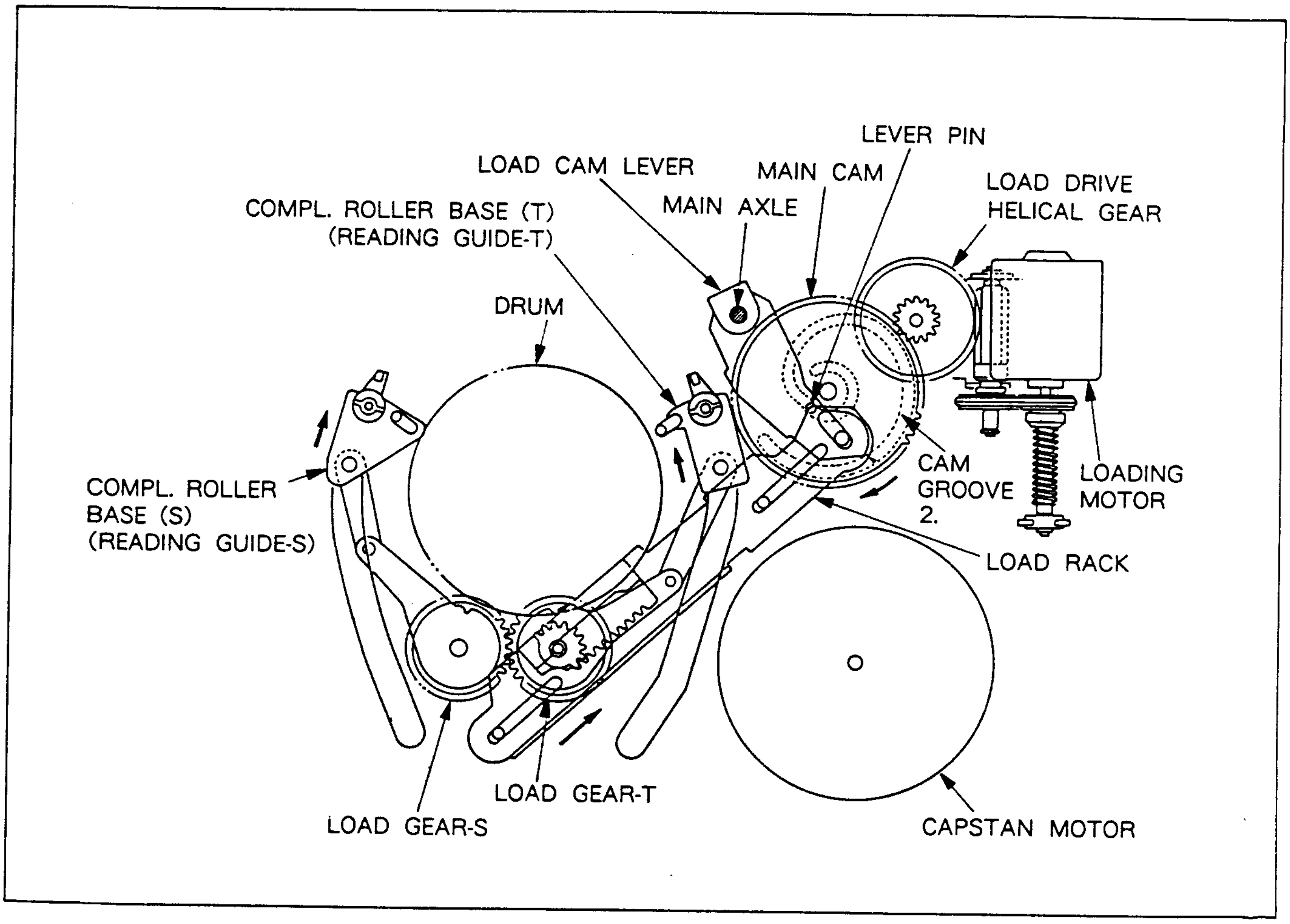

LEVER PIN
LOAD CAM LEVER
MAIN CAM
LOAD DRIVE HELICAL GEAR
COMPL. ROLLER BASE (T) (READING GUIDE-T)
MAIN AXLE
DRUM
CAM GROOVE 2.
LOADING MOTOR
COMPL. ROLLER BASE (S) (READING GUIDE-S)
LOAD RACK
LOAD GEAR-T
LOAD GEAR-S
CAPSTAN MOTOR

Fig. 2-5 CONSTRUCTION OF TAPE LOADING MECHANISM

2-2-2. Pinch Roller Pressing Mechanism

The PINCH LEVER assembly of the pinch roller is operated by the PINCH CAM LEVER (rod) driven by the CAM GROOVE 1 of the before-mentioned MAIN CAM, and then press-fitted to the capstan. The revolving tape guide (REV.GUIDE) is interlockingly operated with the PINCH LEVER assembly to ensure stable tape running at a fixed speed. (Fig. 2-6)

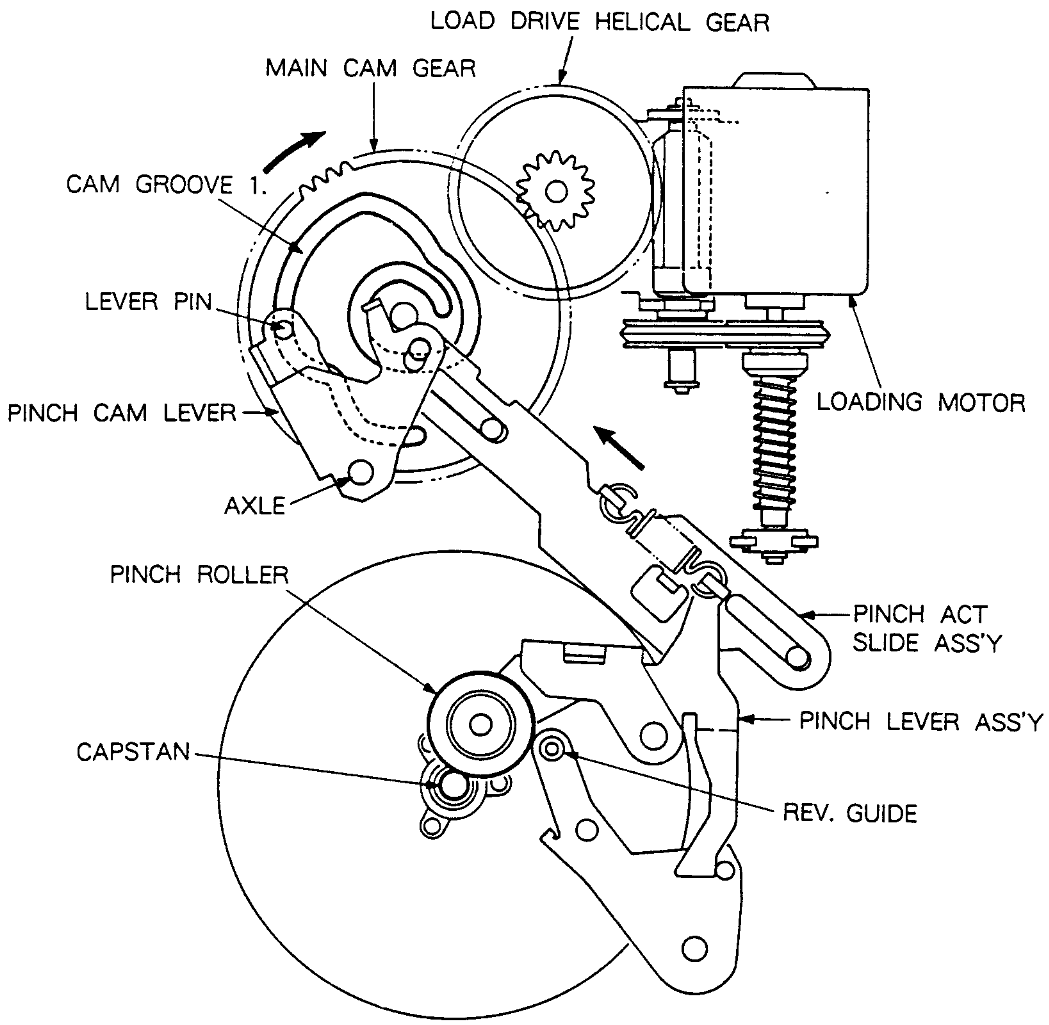

LOAD DRIVE HELICAL GEAR
MAIN CAM GEAR
CAM GROOVE 1.
LEVER PIN
PINCH CAM LEVER
AXLE
PINCH ROLLER
CAPSTAN
LOADING MOTOR
PINCH ACT SLIDE ASS'Y
PINCH LEVER ASS'Y
REV. GUIDE

Fig. 2-6 CONSTRUCTION OF PINCH ROLLER MECHANISM

2-2-3. Operation of Brake Control Plate

The ACT SLIDE PLATE and the MAIN SLIDE PLATE shown in Fig. 2-7 is driven by the CAM GROOVE 4 of the MODE CAM GEAR for precise control of operations including the control of back tension lever, auxiliary brake (SUB BRAKE S/T), main brake (SUPPLY BRAKE and TAKE-UP BRAKE), clutch selection, and drive selection of front loading mechanism.

Also, the mechanism mode switch is engaged with the small gear of the MODE CAM GEAR for sync rotation. At the time, the detection position of each mode is set so that it becomes the flat section at the cam curve of the CAM GROOVE 4 of the MODE CAM GEAR. So, even if motor stop time deviation occurs due to the load following the detection of the loading motor stop position, the control plate linked with a stop in the specified position.

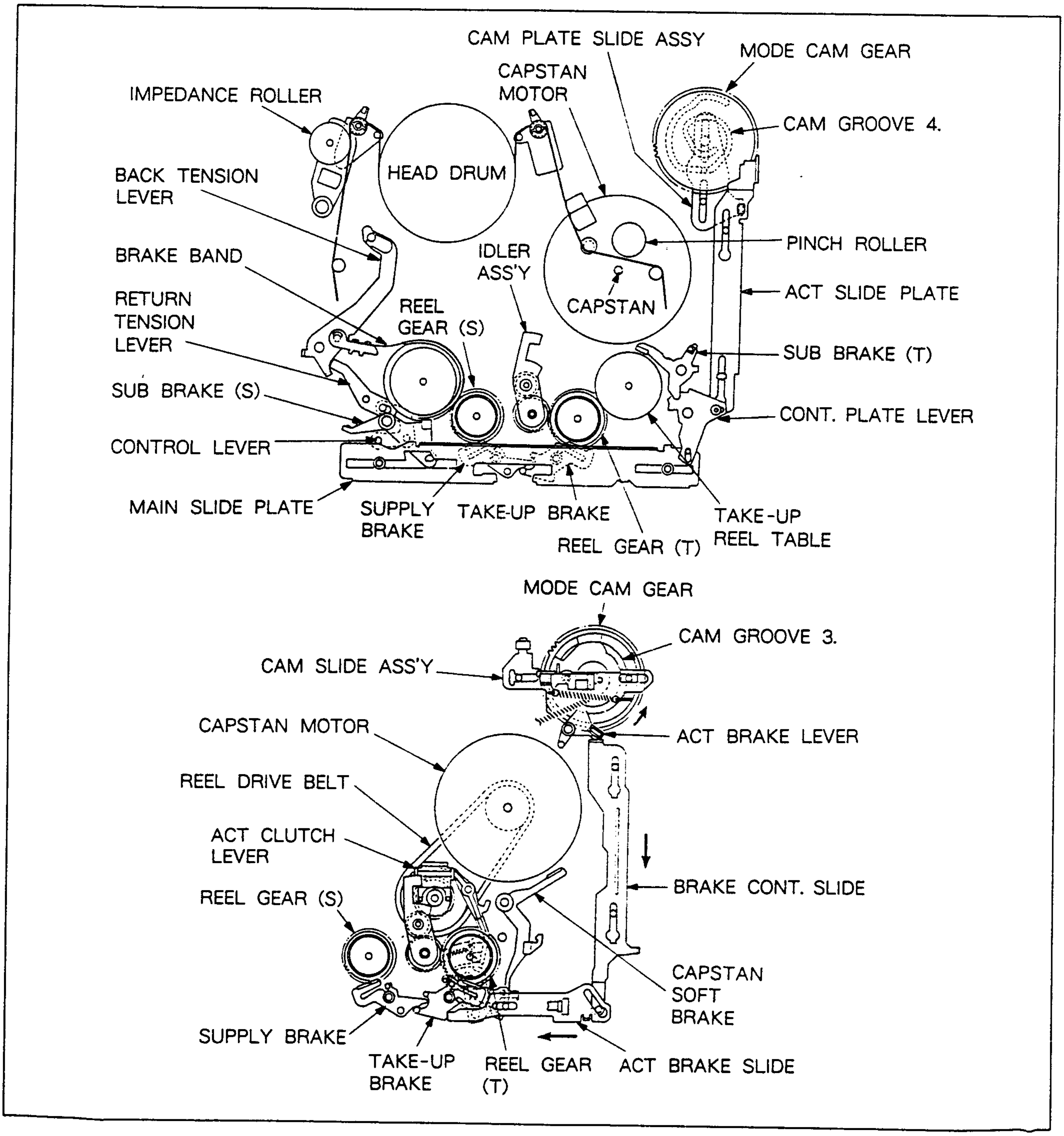

CAM PLATE SLIDE ASSY
MODE CAM GEAR
CAPSTAN MOTOR
IMPEDANCE ROLLER
CAM GROOVE 4.
BACK TENSION LEVER
HEAD DRUM
PINCH ROLLER
BRAKE BAND
IDLER ASS'Y
ACT SLIDE PLATE
RETURN TENSION LEVER
REEL GEAR (S)
CAPSTAN
SUB BRAKE (T)
SUB BRAKE (S)
CONT. PLATE LEVER
CONTROL LEVER
MAIN SLIDE PLATE
SUPPLY BRAKE
TAKE-UP BRAKE
TAKE-UP REEL TABLE
REEL GEAR (T)
MODE CAM GEAR
CAM GROOVE 3.
CAM SLIDE ASS'Y
CAPSTAN MOTOR
ACT BRAKE LEVER
REEL DRIVE BELT
ACT CLUTCH LEVER
BRAKE CONT. SLIDE
REEL GEAR (S)
CAPSTAN SOFT BRAKE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
ACT BRAKE SLIDE

Fig. 2-7 CONSTRUCTION OF BRAKE CONTROL PLATE (AT REW/FF, STOP MODE)

2-2-4. Brake Control Mechanism

The mechanical logic of the brake state is shown in Fig. 2-8. The brake which damps the reel rotation is operated by the BRAKE CONTROL SLIDE driven from the CAM GROOVE 3 of the MODE CAM GEAR.

Also, to alleviate damage to the tape caused by high tension of the brake in operation, the tape is stopped after brake operation and the shape is thoughtfully designed for proper biting-in ratio of the left and the right brakes after-mentioned to each other.

This enables the supply brake to be released by the operation of the above-mentioned MAIN SLIDE PLATE after an elapse of prefixed slight time to reduce the tape tension to zero, and to provide the tape with a proper degree of looseness. As a result, a slight gap is created in the tape from the HEAD DRUM.

Further, a momentary still mechanism which dispenses with use of a plunger solenoid is not provided as one of design features of the P-90 mechanism.

To stabilize the image in an extremely short period of time during a shift to the STILL mode from the PLAY mode, the auxiliary brake (CAPSTAN SOFT BRAKE) is press-fit to the outer circumference of the capstan motor by the before-mentioned CAM GROOVE 3 of the MODE CAM GEAR.

These operations is interlocked with the operation of the before-mentioned ACT SLIDE PLATE and the MAIN SLIDE PLATE. It consists of one MODE CAM for offsetting the operating position.

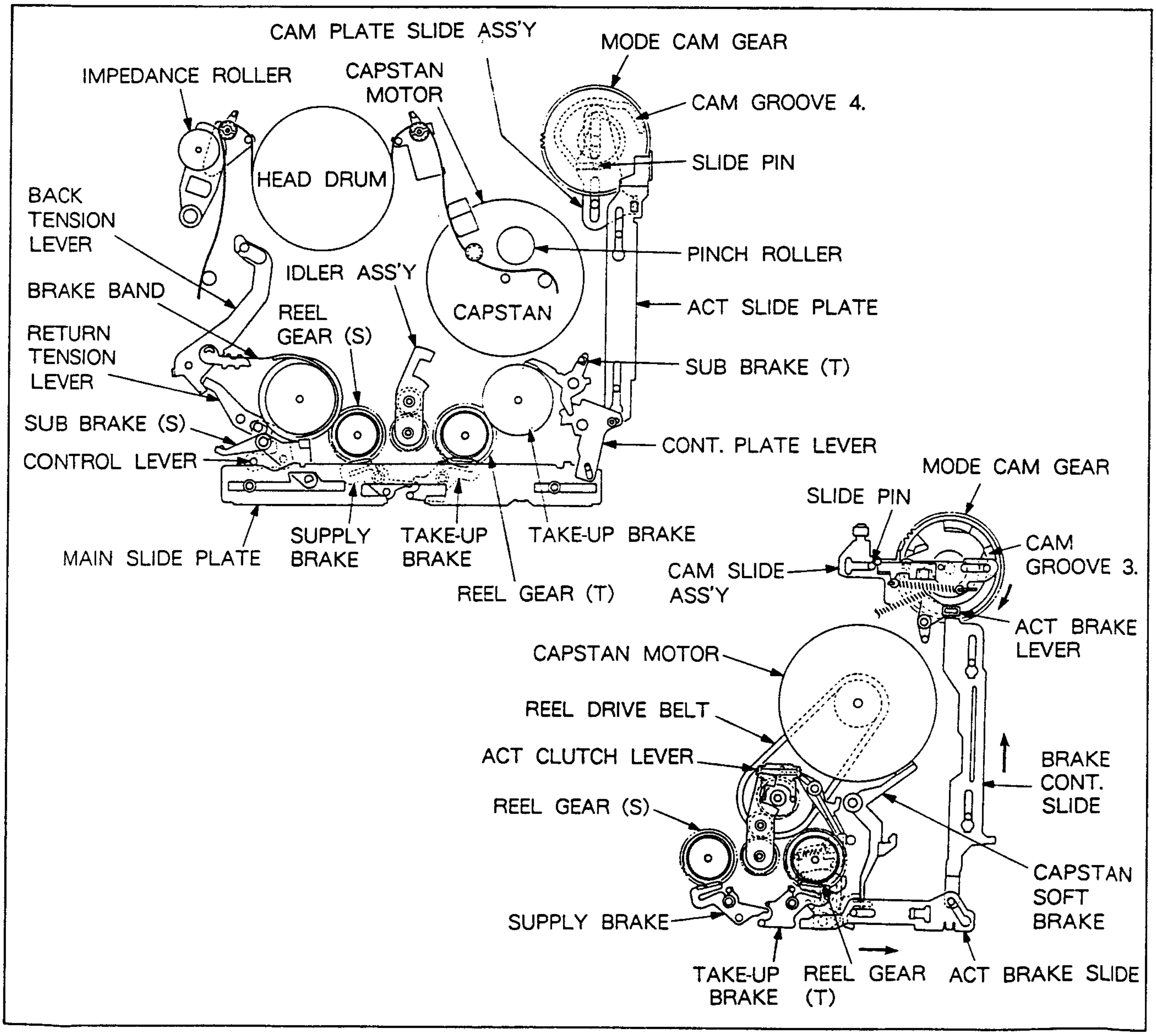
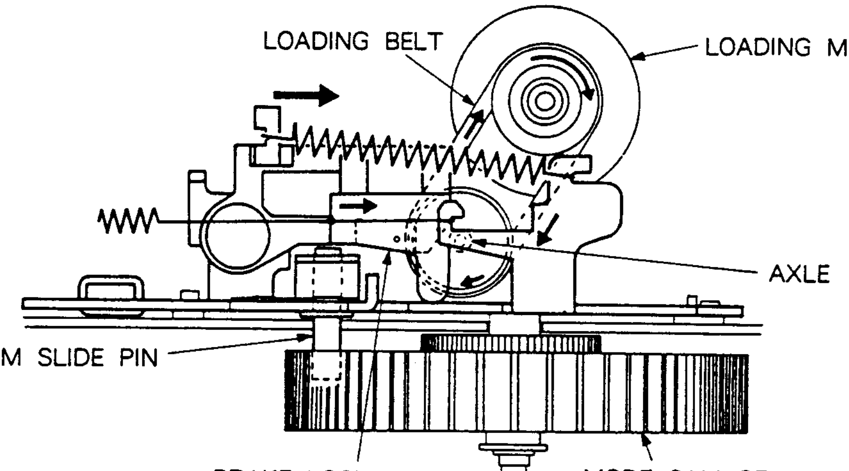

CAM PLATE SLIDE ASS'Y
MODE CAM GEAR
IMPEDANCE ROLLER
CAPSTAN MOTOR
CAM GROOVE 4.
SLIDE PIN
HEAD DRUM
BACK TENSION LEVER
PINCH ROLLER
IDLER ASS'Y
BRAKE BAND
ACT SLIDE PLATE
REEL GEAR (S)
CAPSTAN
RETURN TENSION LEVER
SUB BRAKE (T)
SUB BRAKE (S)
CONT. PLATE LEVER
CONTROL LEVER
MODE CAM GEAR
SLIDE PIN
MAIN SLIDE PLATE
SUPPLY BRAKE
TAKE-UP BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
CAM SLIDE ASS'Y
CAM GROOVE 3.
ACT BRAKE LEVER
CAPSTAN MOTOR
REEL DRIVE BELT
ACT CLUTCH LEVER
BRAKE CONT. SLIDE
REEL GEAR (S)
CAPSTAN SOFT BRAKE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
ACT BRAKE SLIDE

Fig. 2-8 CONSTRUCTION OF BRAKE CONTROL PLATE (AT BRAKE MODE)

2-2-5. Brake Lock Release Mechanism (FF/REW→STOP Mode)

The brake lock momentary release mechanism is shown in Fig. 2-9 ⓐ, ⓑ and Fig. 2-10.
In the FF/REW mode (Fig. 2-9 ⓐ) mechanical elastic load is given to the BRAKE LOCK LEVER mounted on the BRAKE CAM SLIDE which causes the brake to operate, and it is locked to the high-speed rotary axle of the 1st reducing section of the loading motor.

ⓐ changes from brake mode or lock released state to FF/REW, STOP mode.

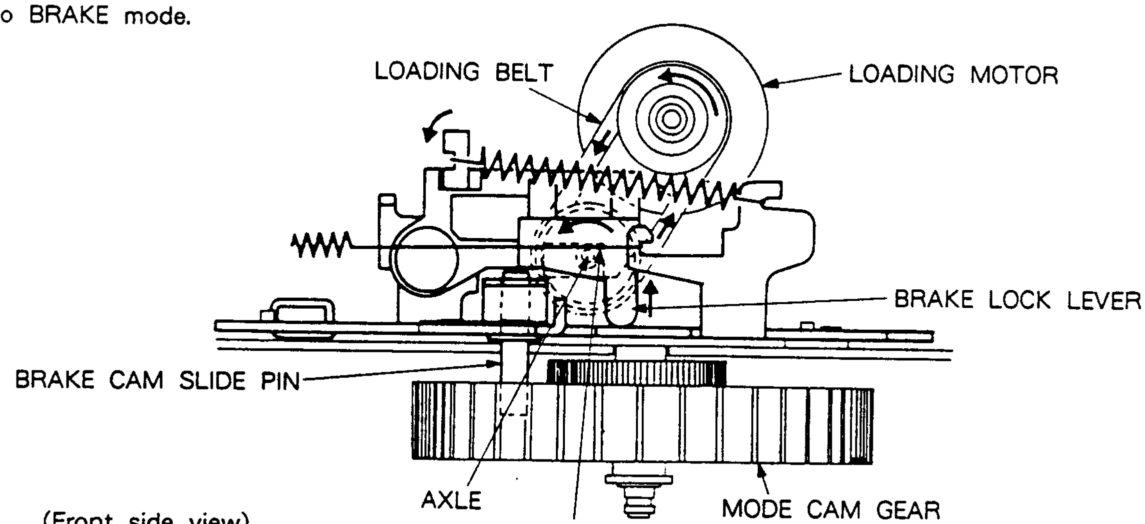

LOADING BELT
LOADING MOTOR
AXLE
BRAKE CAM SLIDE PIN
BRAKE LOCK LEVER
MODE CAM GEAR

(Front side view)

Fig. 2-9 ⓐ BRAKE LOCK & RELEASE MECHANISM

At the time of a shift to the STOP mode from the FF/REW (Fig. 2-9 ⓑ), the BRAKE LOCK LEVER releases the lock on slight rotation of the axle by contact between the rotary shaft and the friction resistance so that the brake can be instantaneously applied to the reel. The lock release speed is almost the same as the start-up of the loading motor. So, the its response to the brake is very quick, and construction is simplified also.

ⓑ Changes from FF/REW, STOP mode to BRAKE mode.


LOADING BELT
LOADING MOTOR
BRAKE LOCK LEVER
BRAKE CAM SLIDE PIN
AXLE
MODE CAM GEAR

(Front side view)

Lock is released by the frictional resistance of an elastic load.

Fig. 2-9 ⓑ BRAKE LOCK & RELEASE MECHANISM

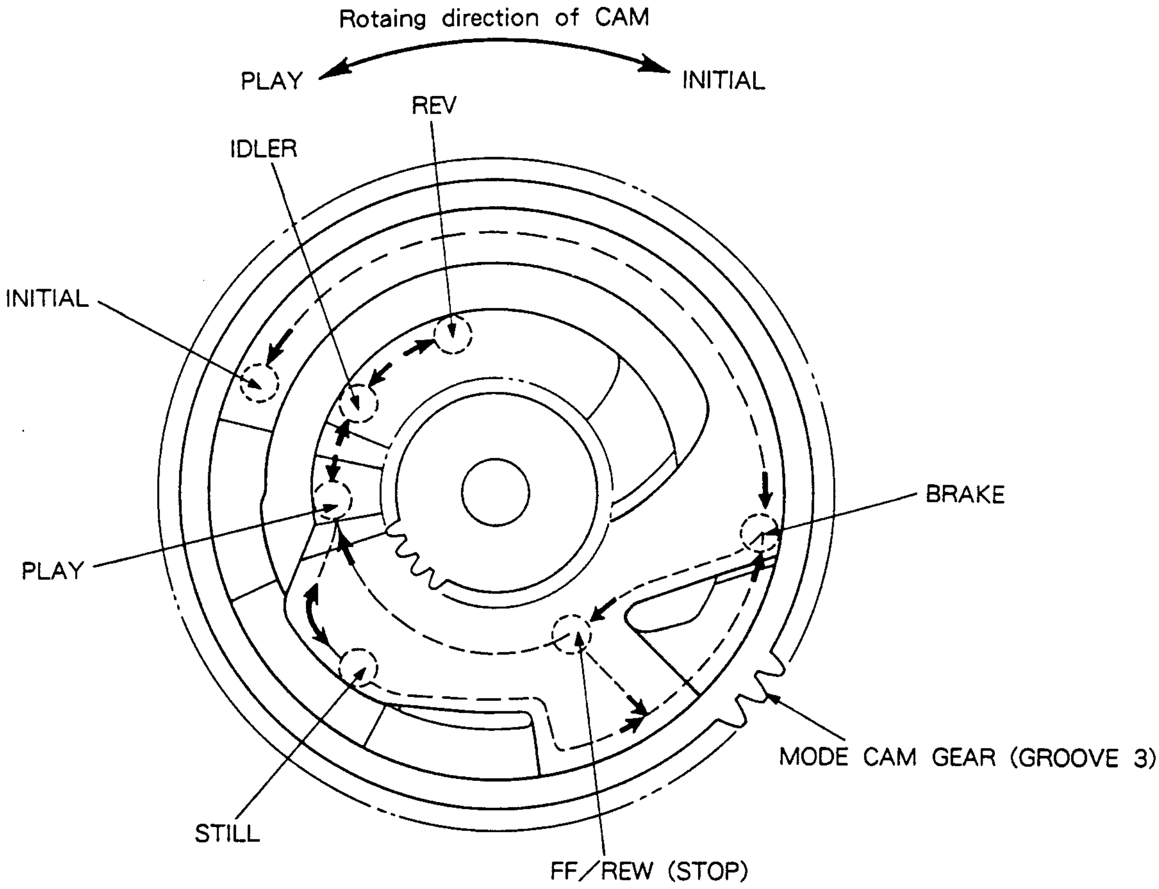

Rotaing direction of CAM
PLAY
INITIAL
REV
IDLER
INITIAL
BRAKE
PLAY
MODE CAM GEAR (GROOVE 3)
STILL
FF/REW (STOP)

Fig. 2-10 POSITIONING OF BRAKE CAM SLIDE-PIN ON THE GROOVE 3 OF MODE CAM GEAR

2-3. REEL TABLE DRIVE

2-3-1. Reel Table Drive Mechanism

This mechanism employs the system of driving the tape from the DD capstan motor via rubber belt. In the tape constant speed running mode for PLAY, F-SEARCH, and R-SEARCH, the capstan and the pinch roller are press-fitted to allow the tape to run at a constant speed. By providing a FRICTION MECHANISM in between the capstan motor and the reel table, the tape is taken up. In the FF/REW tape high-speed take-up mode, the capstan and the pinch roller are separated from each other, and the capstan motor and the reel table are linked direct by the clutch mechanism to carry out tape take-up. Also, to realize a thin type reel table drive section, the mechanism is simplified and the rotary parts are thinned for realization of physically compact design, and a step is provided on the reel table mounting section of the chassis by high-precision drawing process. A simplified figure of the drive mechanism is shown in Fig. 2-11 and Fig. 2-12. Power transmission to the pulley of the clutch mechanism section is done from the DD capstan motor via rubber belt.

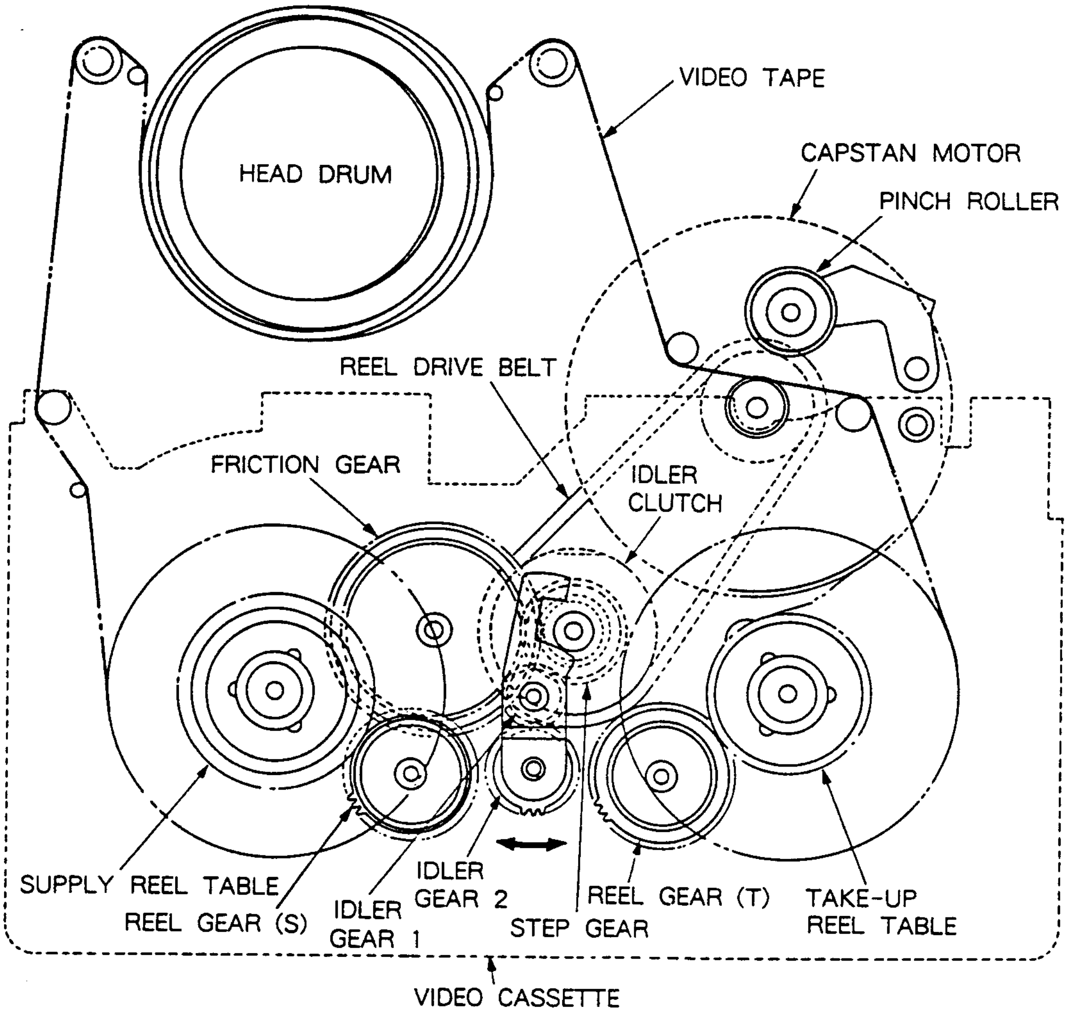
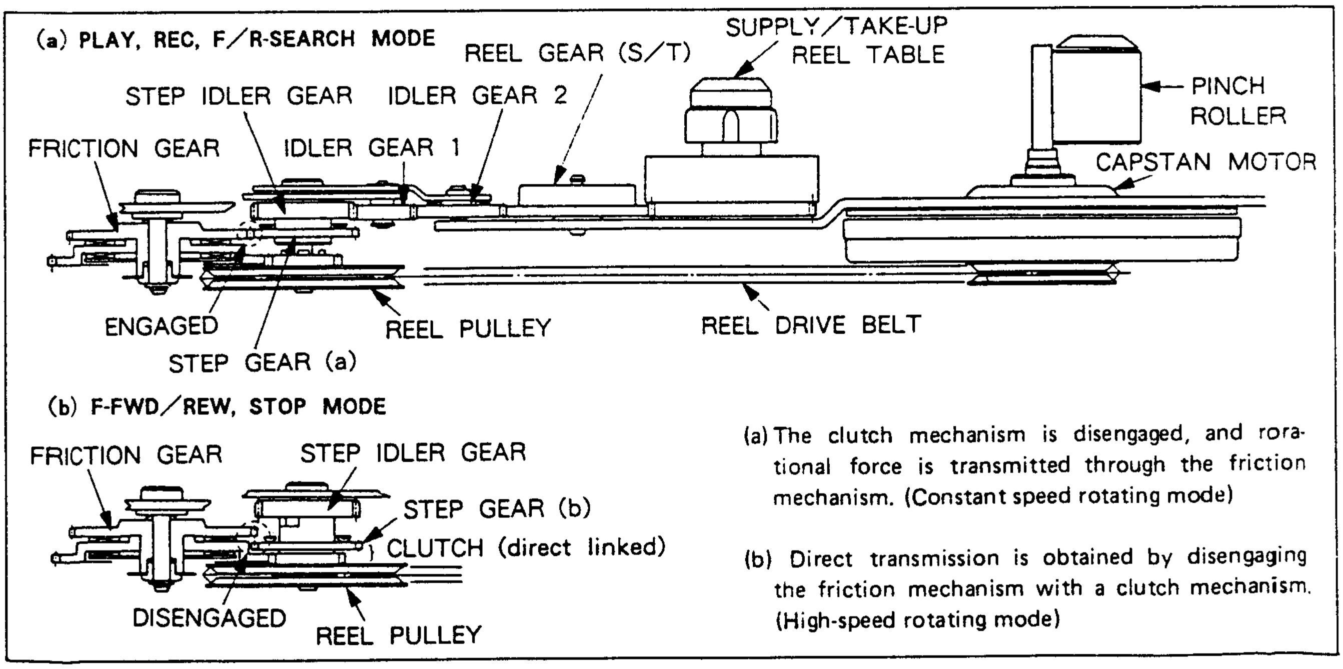

HEAD DRUM
VIDEO TAPE
CAPSTAN MOTOR
PINCH ROLLER
REEL DRIVE BELT
FRICTION GEAR
IDLER CLUTCH
SUPPLY REEL TABLE
REEL GEAR (S)
IDLER GEAR 1
IDLER GEAR 2
STEP GEAR
REEL GEAR (T)
TAKE-UP REEL TABLE
VIDEO CASSETTE

Fig. 2-11 REEL TABLE DRIVE

At that time, the reel table winding speed and the torque needed in a wide variety of modes are obtained by shifting the up and down STEP GEAR positioned at the upper section of pulley. The selection of the STEP GEAR is precision controlled by the MODE CAM GEAR via the BRAKE CONTROL SLIDE. With the up and down STEP GEAR down, the clutch mechanism is direct linked, and the transmission power from the capstan motor is sent to the reel table via IDLER GEAR assembly and REEL GEAR (S/T). On the other hand, FRICTION MECHANISM acts between the pulley and the STEP GEAR when the up and down STEP GEAR are in the elevated state, thereby controlling the transmission torque for generation of the take-up slip. Normally, it is desirable that the take-up torque of the reel table is higher in the R-SEARCH mode than that in the PLAY mode. This is because in the forward tape running the tape winding load to the HEAD DRUM has to be taken care of the capstan and the pinch roller.
While, in the reverse tape running mode the winding load has to be taken on the take-up reel table. In the special playback operation, a mechanism for varying the take-up torque of the reel table is required to be changed depending upon the running direction of the tape. But in this mechanism, the torque selection is made by varying the reduction speed ratio up to the reel table from the capstan motor on both the forward side and the reverse side of the tape. Also, design simplification of the selection mechanism is realized by using a single friction mechanism. In other words, the take-up torque necessary for forward/reverse rotation is obtained by controlling the capstan motor speed. Rotation speed and torque needed for each mode of operation are converted by clutch mechanism for transmission of the drive power to the idler mechanism. The left and right moving IDLER GEAR assembly is automatically rotated to the left and the right according to the direction of capstan motor rotation by using the friction force. Because the mechanism is so designed as to drive the reel table of the side on which the tape is transported by the capstan and pinch roller, the forward and reverse constant speed drive (the PLAY, REC, F/R SEARCH modes) is carried out in the state in which the FRICTION MECHANISM is being operated (Fig. 2-12 ⓐ) On the other hand, in the condition in which the friction mechanism is not in operation, the forward/reverse high speed drive (FF/REW mode) is made possible (Fig. 2-12 ⓑ). Also, the reel drive in all modes is taken care of by the single left and right moving idler for design simplification.

The idler body employs gear drive to improve reliability with a view to realizing parts thinning while securing the transmission reliability. Using a resin molded gear as material of an idler, the efficiency of the entire reel drive system has been improved because there are no deformation and loss, and minimized rotation moving torque necessary for biting-in as in the case of a material such as rubber which shows considerable elastic deformation, etc. Further in this mechanism, an intermediate gear is provided in between the reel side and the idler to minimize the rotating and moving angle of the left and right moving idlers, thereby holding the reversing time to a minimum when shifting to the tape running direction change mode. This results in significantly reduced possibility of tape looseness.



(a) The clutch mechanism is disengaged, and rorational force is transmitted through the friction mechanism. (Constant speed rotating mode)

(b) Direct transmission is obtained by disengaging the friction mechanism with a clutch mechanism. (High-speed rotating mode)

Fig. 2-12 REEL TABLE DRIVE (SIDE VIEW)

2-3-2. Reel Table Drive Clutch Lock and Release Mechanism

As described in the preceding section, using the selection of the step gear (CLUTCH MECHANISM), two mechanisms which are driven by being selected via direct drive or via FRICTION MECHANISM from the capstan motor, to execute the reel table drive. The operating status of the clutch lock and the releasing mechanism is shown in Fig. 2-13.

Fig. 2-13 ① shows the tape unloading position (INITIAL position) when the power for the mechanism operating mode is switched off.

At that times all the levers are in the initial positions, and the clutch is released also so that a route for reel table drive is created via a friction mechanism.

Fig. 2-13 ② shows that the mechanism operation mode has executed the tape loading and that it has completed its movement to the STOP (stand-by), FF/REW position.

At this time, the CLUTCH ACT LEVER is operated by the hook of the ACT BRAKE SLIDE to move the ACT CLUTCH LEVER in the direction of arrow via the CLUTCH LEVER and the CLUTCH CHANGE LEVER. Now, the up and down STEP GEAR is placed into the direct coupled state. In the FF/REW mode, the reel table is directly driven so that the rotation of the capstan motor is directly transmitted to make high-speed rotation drive possible. When shifting the mode to the STOP from the FF/REW in this condition, the mechanism mode position is once moved back to the brake position, and when the reel table brake is instantaneously applied, the clutch is released once at the same time, after which it returns to the same mechanism mode as the FF/REW mode once again. Now, it is placed in a waiting state in the same condition of the STOP mode as shown in Fig. 2-13 ②.

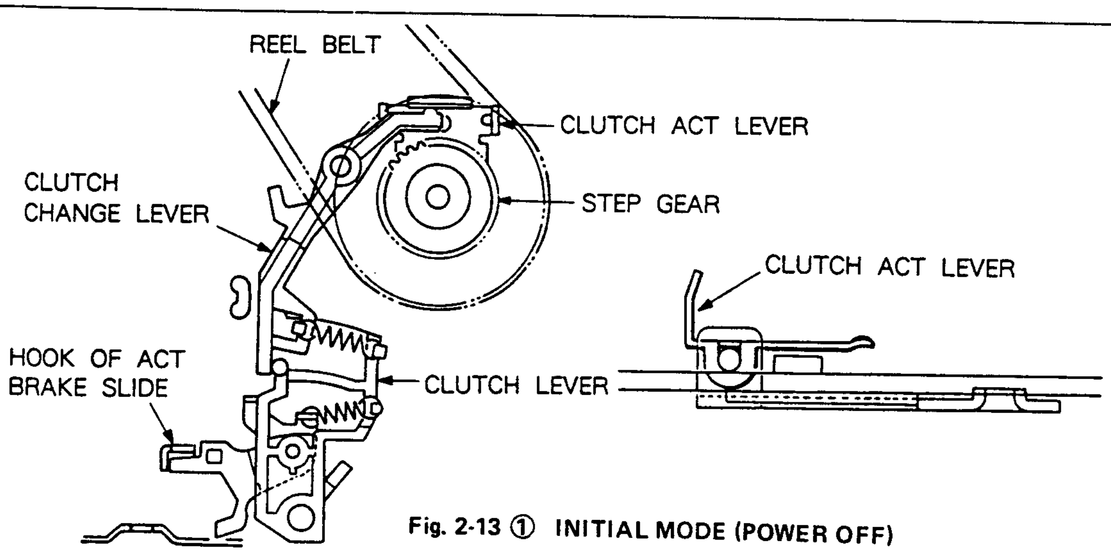
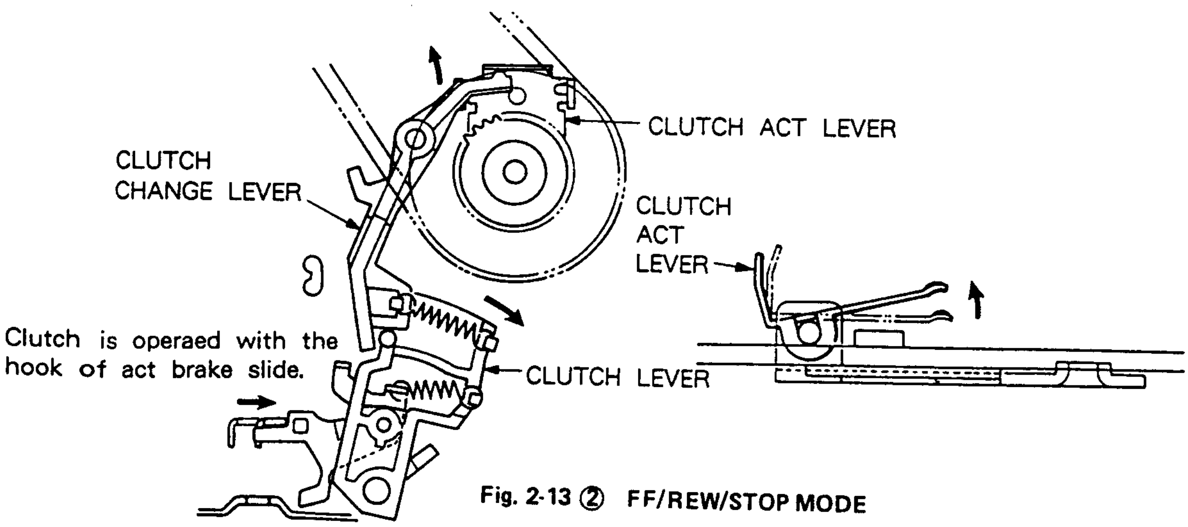


Fig. 2-13 ① INITIAL MODE (POWER OFF)



Clutch is operaed with the hook of act brake slide.

Fig. 2-13 ② FF/REW/STOP MODE

Fig. 2-13 ① – ③ REEL TABLE DRIVE CLUTCH LOCK AND RELEASE MECHANISM

Fig. 2-13 ③ shows the completion state of a shift to the PLAY mode via the STILL mode from the STOP (FF/REW) mode for the mechanism mode position.
In the case of this mode shifting, the movement of the BRAKE ACT SLIDE remains fixed. So, the CLUTCH ACT LEVER should be unlocked by the movement of the hook of the MAIN SLIDE PLATE to cause the clutch to be released. This movement in turn causes the capstan motor rotation to be transmitted via the friction mechanism. So, the constant speed rotation drive necessary for the PLAY (REC) mode and SEARCH mode is made possible.

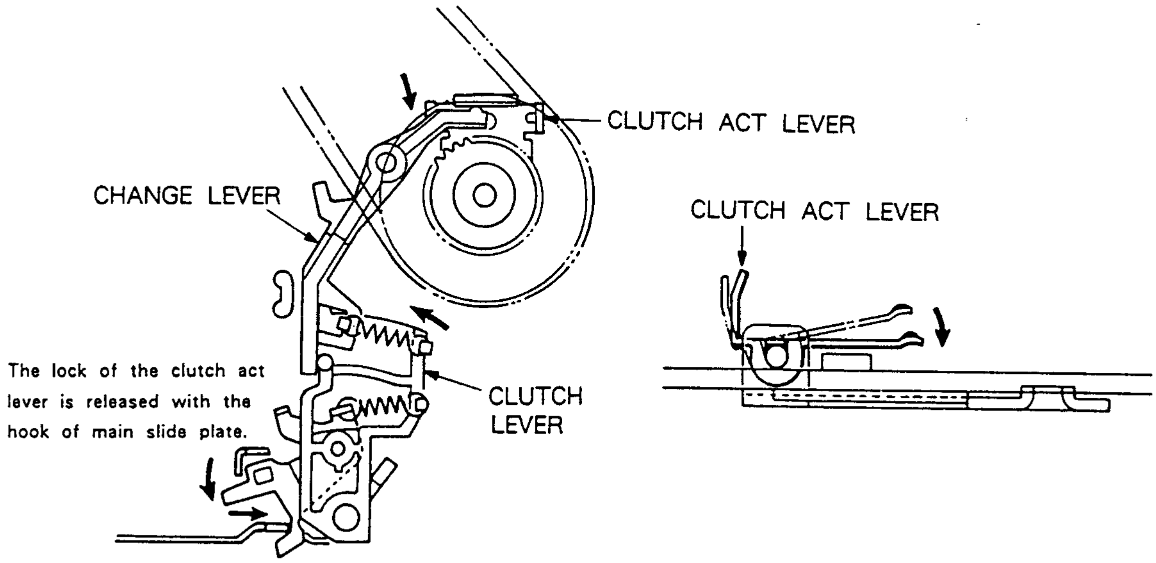

CLUTCH ACT LEVER
CHANGE LEVER
CLUTCH ACT LEVER
The lock of the clutch act lever is released with the hook of main slide plate.
CLUTCH LEVER

Fig. 2-13 ③ FF/REW/STOP MODE → STILL MODE → PLAY MODE

2-4. FRONT LOADING DRIVE SELECTION MECHANISM

In the P-90 mechanism, the motor dedicated to the use of front loading is not employed. The drive source is utilized instead of the tape loading motor. As shown in Fig. 2-14 ⓐ/ⓑ, during the front loading the FRONT LOAD WORM GEAR directly coupled to the tape loading motor axle and the FRONT HELICAL GEAR with several teeth missing are engaged with each other and rotated for transmission of the drive force to the front loading mechanism. When the cassette tape is inserted completely in the mechanism, the FRONT HELICAL GEAR is automatically disengaged from the FRONT LOAD WORM GEAR. After that, the tape loading operation is performed without the tape loading motor drive force being transmitted to the front loading mechanism.

While the drive force is being transmitted to the front loading mechanism, the CAM GROOVEs of the before-mentioned MAIN CAM GEAR and the MODE CAM GEAR are flat in cam line pattern. These are therefore held without changing the mode state of the mechanism in any way.

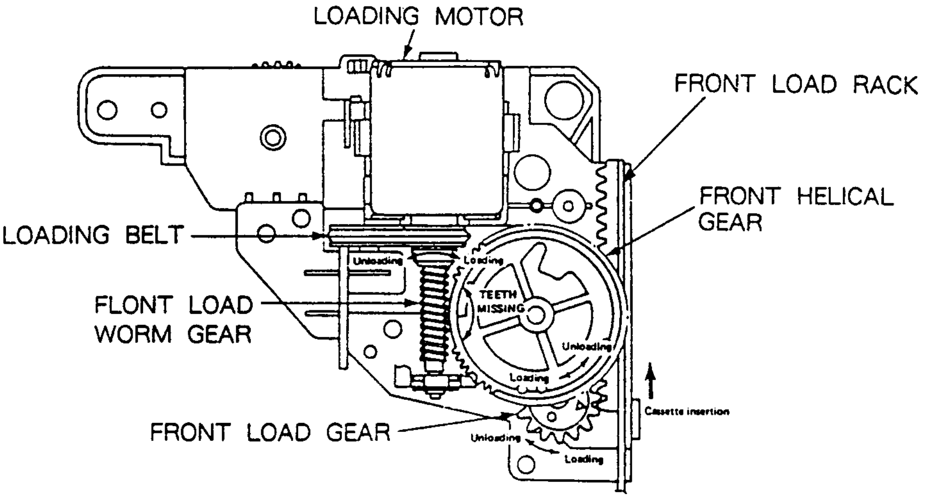

LOADING MOTOR
FRONT LOAD RACK
FRONT HELICAL GEAR
LOADING BELT
Unloading
Loading
TEETH MISSING
FLONT LOAD WORM GEAR
Unloading
Loading
Cassette insertion
FRONT LOAD GEAR
Unloading
Loading

Fig. 2-14 ⓐ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE INSERTED POSITION)

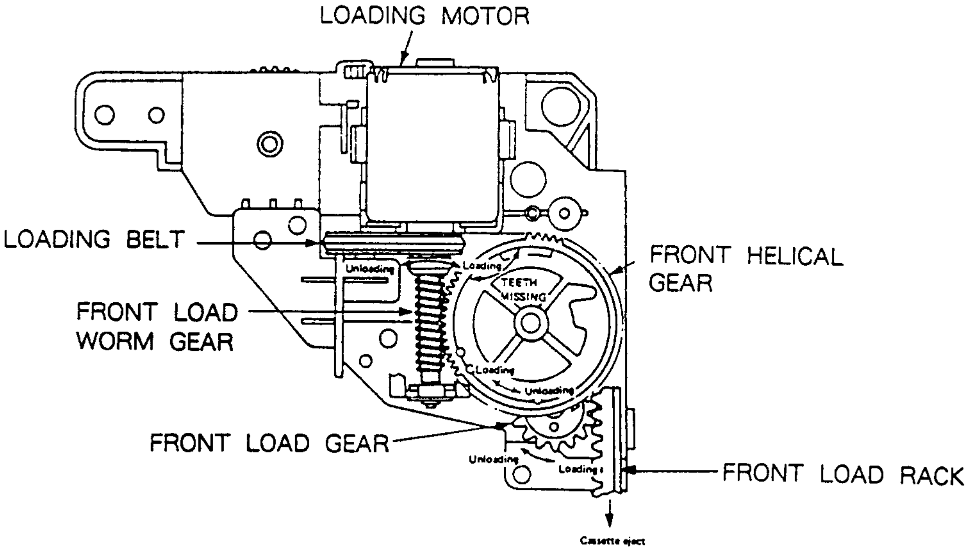

LOADING MOTOR
LOADING BELT
Unloading
Loading
TEETH MISSING
FRONT HELICAL GEAR
FRONT LOAD WORM GEAR
Loading
Unloading
FRONT LOAD GEAR
Unloading
Loading
FRONT LOAD RACK
Cassette eject

Fig. 2-14 ⓑ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE EJECTED POSITION)

(A) Cassette inserting operation

When inserting a cassette from the cassette ejected state of Fig. 2-14 ⓑ, the FL START SWITCH shown in Fig. 2-15 is turned OFF, to cause the loading motor to be rotated in the direction of insetting. As a result, the FRONT LOAD RACK is drawn in, and the front loading is made up to the cassette tape completion point. So, it is locked in the grooves shown in Fig. 2-15 to complete cassette inserting. At that time, the FRONT HELICAL GEAR is positioned at ⓐ of Fig. 2-14, and is released from the front loading mechanism, therefore, the tape loading operation is continuously performed.

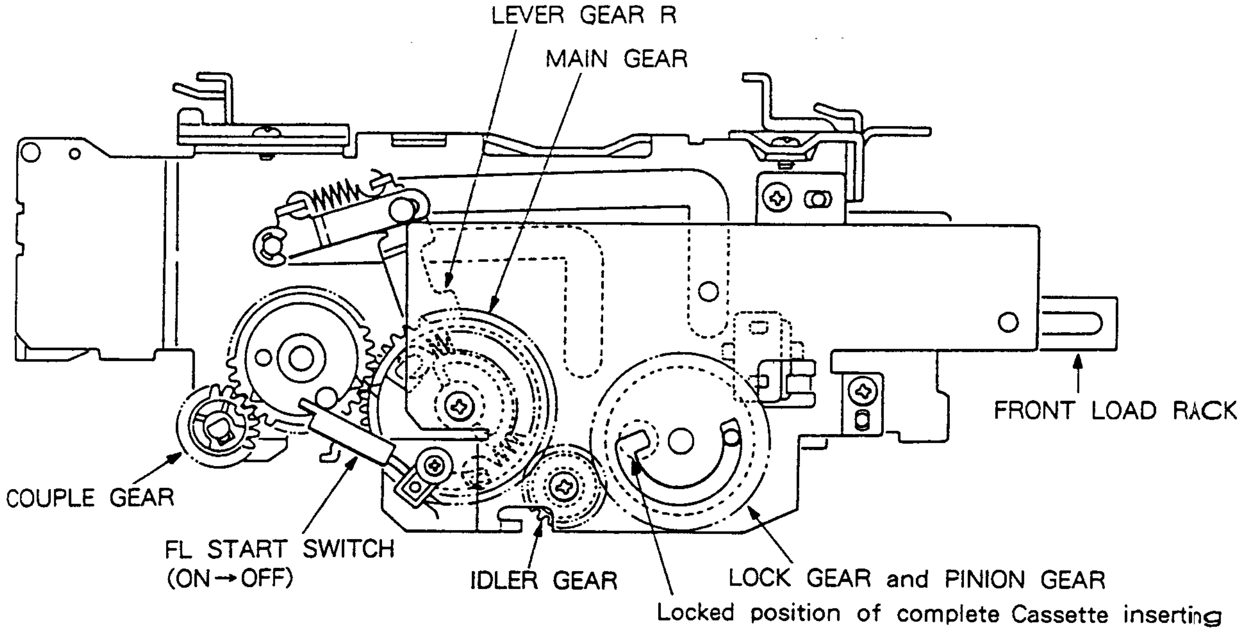

LEVER GEAR R
MAIN GEAR
FRONT LOAD RACK
COUPLE GEAR
FL START SWITCH
(ON→OFF)
IDLER GEAR
LOCK GEAR and PINION GEAR
Locked position of complete Cassette inserting

Fig. 2-15 CASSETTE HOLDER MECHANISM (CASSETTE INSERTING OPERATION)

(B) Cassette ejection operation

The components of the front loading mechanism is shown in Fig. 2-16.

When ejecting the cassette from the inserted state shown in Fig. 2-14 ⓐ, the FRONT ACT LEVER is pushed in the direction of arrow due to the ACT SLIDE PLATE moves in the direction of arrow shown in Fig. 2-17. As a result, the FRONT LEVER assembly is turned counterclockwise via the FRONT LOAD SLIDE to cause the FRONT HELICAL GEAR to be engaged with the FRONT LOAD WORM GEAR of the loading motor. At that time, the loading motor is being rotated counterclockwise, so that the FRONT HELICAL GEAR is caused to be rotated counterclockwise also to carry out the front unloading via the FRONT LOAD GEAR and the FRONT LOAD RACK. At the same time, the FRONT ACT LEVER is operated counterclockwise by the hook of the FRONT HELICAL GEAR. This releases the lock being pushed in the direction of arrow indicated by the ACT SLIDE PLATE. So, the FRONT LOAD SLIDE assembly now moves to the initial position to prepare for the next ejection operation. Incidentally, the movement of the FRONT LEVER assembly performs an important function of positioning the FRONT HELICAL GEAR (Fig. 2-14 ⓐ) upon completion of cassette mounting, in addition to the cassette eject start-up operation.

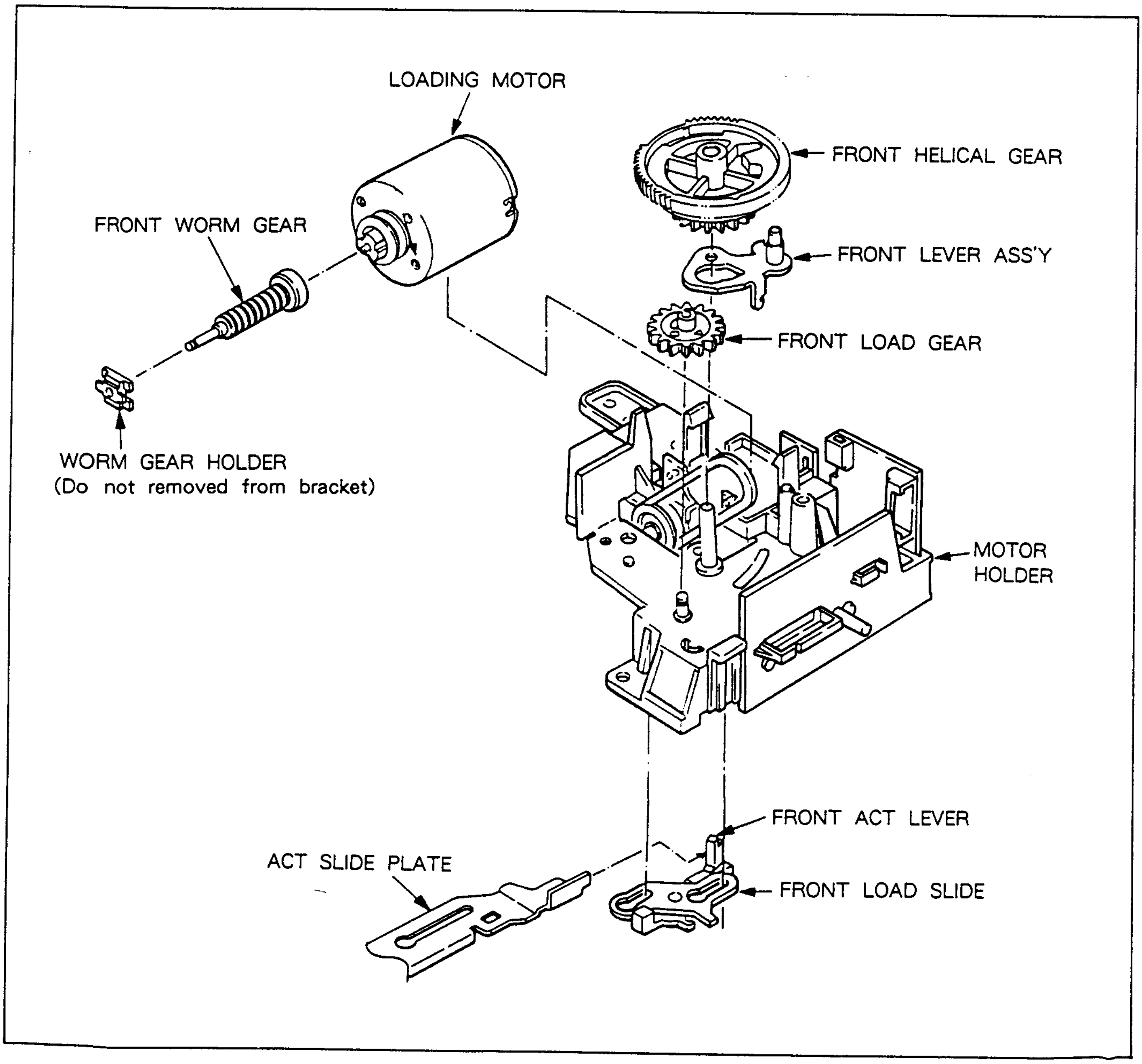
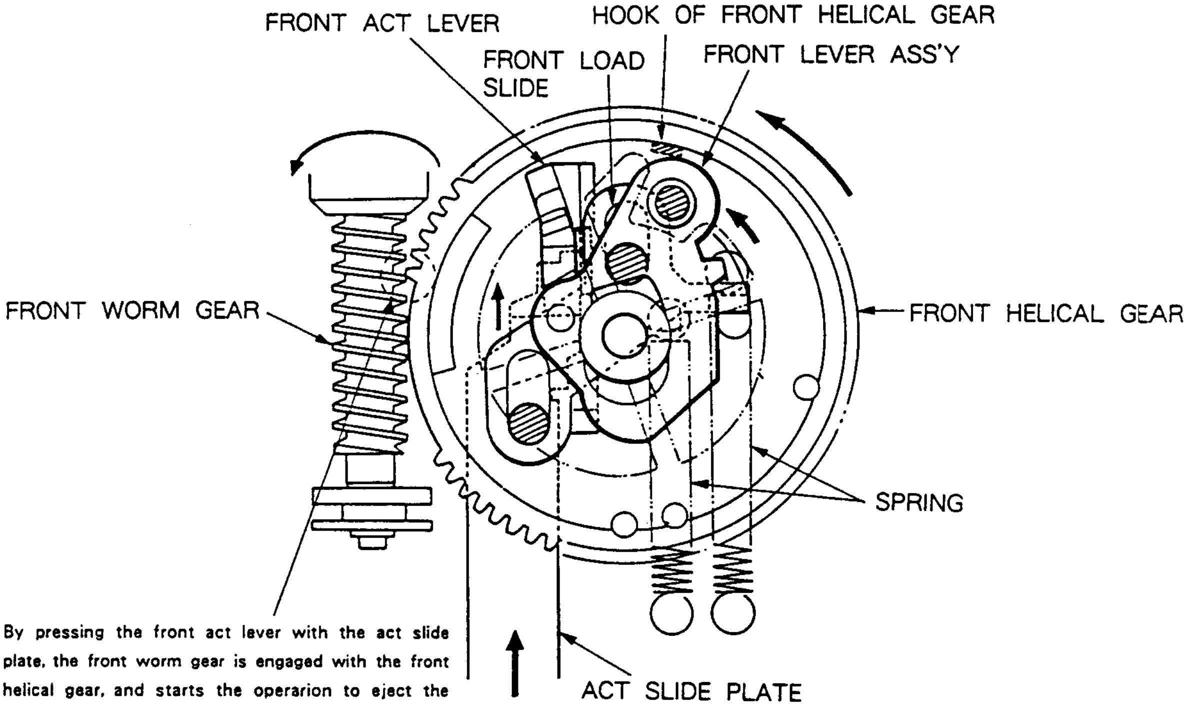

LOADING MOTOR
FRONT HELICAL GEAR
FRONT WORM GEAR
FRONT LEVER ASS'Y
FRONT LOAD GEAR
WORM GEAR HOLDER
(Do not removed from bracket)
MOTOR HOLDER
FRONT ACT LEVER
ACT SLIDE PLATE
FRONT LOAD SLIDE

Fig. 2-16 FRONT LOADING DRIVE SELECTION MECHANISM


FRONT ACT LEVER
HOOK OF FRONT HELICAL GEAR
FRONT LOAD SLIDE
FRONT LEVER ASS'Y
FRONT WORM GEAR
FRONT HELICAL GEAR
SPRING
ACT SLIDE PLATE

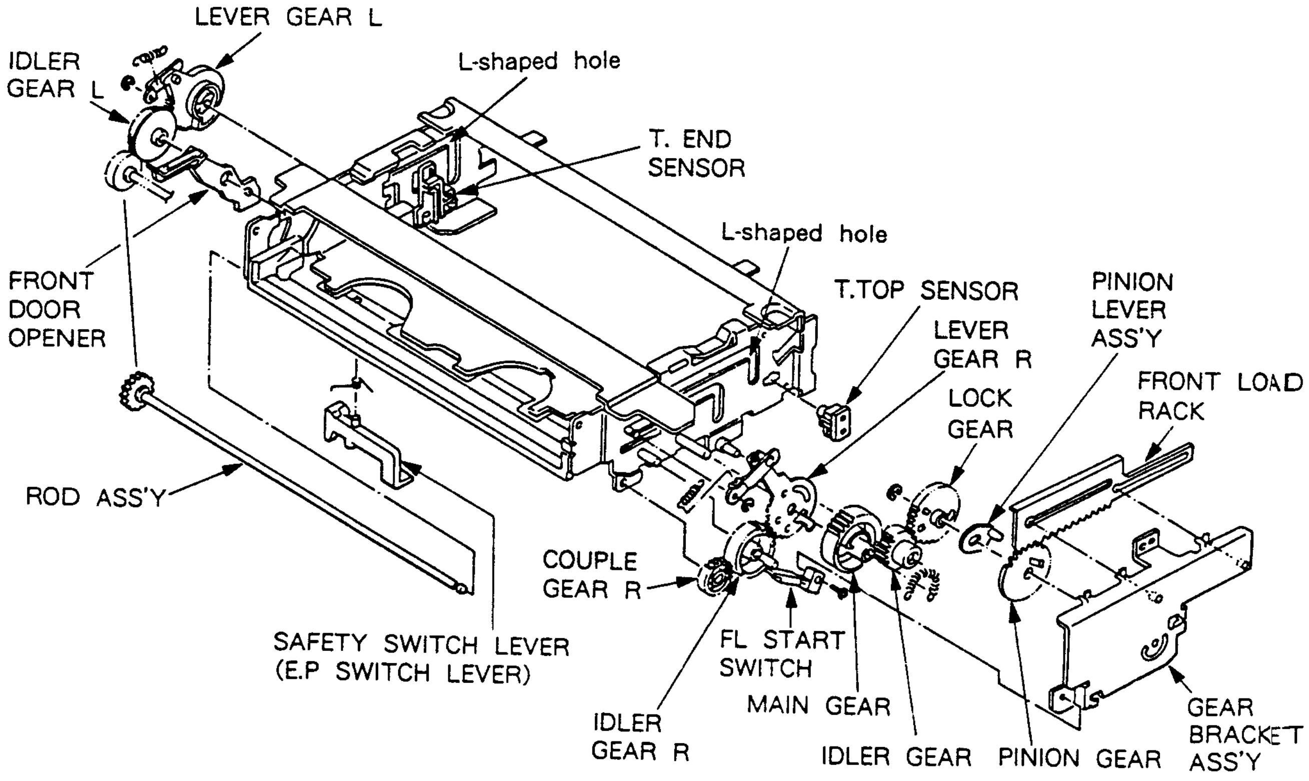
By pressing the front act lever with the act slide plate, the front worm gear is engaged with the front helical gear, and starts the operarion to eject the cassette.

Fig. 2-17 CASSETTE EJECTION START OPERATION (See through top view)

2-5. CASSETTE HOLDER MECHANISM

2-5-1. Components

The exploded view of the cassette holder mechanism is shown in Fig. 2-18. This mechanism consists of a cassette tray for feeding the cassette tape to the specified position of the mechanism chassis, a side plate provided with L type holes for supporting and guiding it, the top plate for regulating the width of left and right, and a group of gears for driving the cassette tray.
The entire mechanism is of independent construction apart from the mechanism body. The holder is fixed on the mechanism chassis by inserting the pawls at two points and tightening the setscrews at two points, or at a total of four points.



LEVER GEAR L
IDLER GEAR L
L-shaped hole
T. END SENSOR
L-shaped hole
FRONT DOOR OPENER
T.TOP SENSOR
PINION LEVER ASS'Y
LEVER GEAR R
FRONT LOAD RACK
LOCK GEAR
ROD ASS'Y
COUPLE GEAR R
SAFETY SWITCH LEVER (E.P SWITCH LEVER)
FL START SWITCH
MAIN GEAR
GEAR BRACKET ASS'Y
IDLER GEAR R
IDLER GEAR
PINION GEAR

Fig. 2-18 EXPLODED VIEW OF THE CASSETTE HOLDER MECHANISM

2-5-2. Description of Cassette Holder

The cassette holder is of motor-less design, as the lowering of mechanism height and driving source are done by the loading motor of the mechanism body.

As a substitute for the worm gear system hitherto used in the major drive section for the drive selection mechanism mentioned in section 2-4., the RACK LOADING system is adopted in this cassette holder mechanism. By this mechanism the motor-less design can be realized. An exploded view of the mechanism is shown in Fig. 2-19. A description of the operation is made below along with Fig. 2-19. To press-fit the cassette tape after sending it onto the mechanism chassis, the PINION GEAR section is triple construction. The FRONT LOAD RACK side and the IDLER GEAR side are independently engaged. The PINION GEAR and the LOCK GEAR are connected from the PINION LEVER PIN riveted to the PINION LEVER. Even after feeding the cassette tape to the specified position of the mechanism chassis, the FRONT LOAD RACK slides, giving the rotation to the PINION GEAR which is engaged with the FRONT LOAD RACK. At that time, a pin is dropped into the groove section provided on the GEAR BRACKET ASS'Y.

The other LOCK GEAR is fixed by this PINION LEVER PIN, and the cassette tape is press-fitted onto the mechanism chassis by linked IDLER GEAR. The before-mentioned FRONT LOAD RACK and the PINION GEAR are set free after dropping the PINION LEVER PIN into the groove section. So, the drive force of the loading motor is sent to the mechanism body.

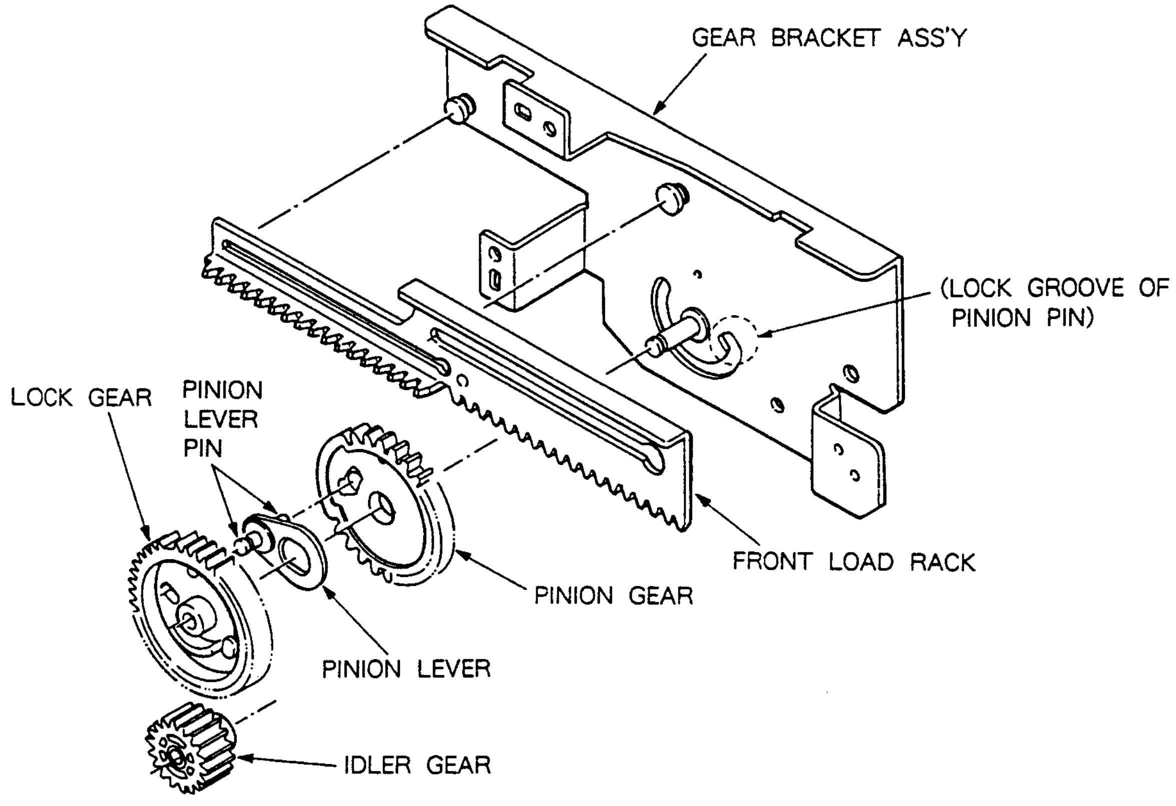


Fig. 2-19 RACK LOADING MECHANISM OF CASSETTE HOLDER

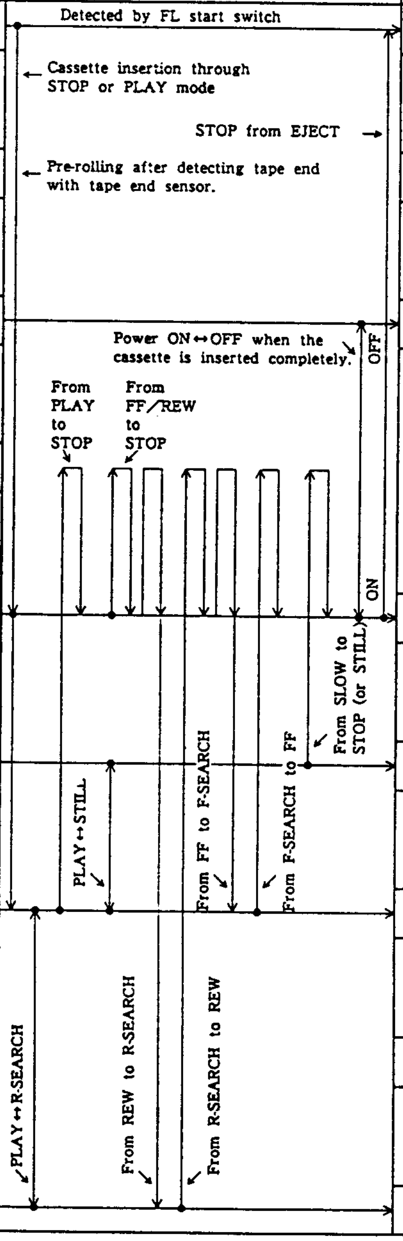
3. MECHANISM CONTROL

3-1. MODE ARRANGEMENT

This mechanism is arranged in such a mode layout as shown in Table. 3-1 and as described in section 2-1. The mode sensing switch described below is used for control of these modes.

3-2. MODE DETECTION SWITCH

For mode detecting one leaf switch (FL START SWITCH and one rotary switch (MECHANISM MODE SWITCH) are used in combination.


Main Mode Shifting Conditions
Detected by FL start switch
Cassette insertion through STOP or PLAY mode
STOP from EJECT
Pre-rolling after detecting tape end with tape end sensor.
Power ON↔OFF when the cassette is inserted completely.
OFF
ON
From PLAY to STOP
From FF/REW to STOP
From SLOW to STOP (or STILL)
PLAY↔STILL
From FF to F-SEARCH
From F-SEARCH to FF
PLAY↔R-SEARCH
From REW to R-SEARCH
From R-SEARCH to REW

Mechanism Mode	Mechanism Mode Switch 3	Mechanism Mode Switch 2	Mechanism Mode Switch 1	HEX DATA	Function	VTR Operation Mode
EJECT	–	–	–		Eject position	EJECT
					Front loading/Unloading	
SHORT REW	–	–	–		Take up operation in the tape end position	Low side of ⑤. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position	Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position	
BRAKE	0	0	1	①	Main brake applying position	
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)	STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.	STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode	PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position	PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode	R-SEARCH

Table 3-1

(1) Switch component
The mode switch consists of FL START SWITCH for detecting the cassette ejection and insertion, and MECHANISM MODE SWITCH for detecting the each mode position of the mechanism. As can be understood from Fig. 3-1, the MECHANISM MODE SWITCH rotates in excess of 360 degrees. Therefore, the sensing of a signal from the MECHANISM MODE SWITCH is done by the leaf switch.
In the P88 and P89 mechanisms, incidentally, short REW position is detected by the FL END SW, but in the P90 mechanism, the FL END SWITCH is not required due to a change in the internal structure of the MECHANISM MODE SWITCH.

(2) Mechanism mode switch
The mechanism mode switch consists of four terminals, namely, COM, DATA1, DATA2, and DATA3. These are processed as 3-bit signals for discrimination of seven modes.
The MECHANISM MODE SWITCH is not interchangeable with the hither to available black switch due to a change in its internal structure. Be sure therefore to use a blue switch.

3-3. CONSIDERATION TO FULL LOADING

① In the normal stop condition, the head drum is rotated to facilitate the start-up of the image at the time of playback, but it is conceivable that this is left undisturbed for an extended period of time. This may result in wear of the video head. For this reason, when five minutes elapse from the stop condition, the head drum stops rotating.

② To prevent the tape from being caught in the head drum due to dew forming, etc., the tape is housed in the unloaded cassette when turning the power off.

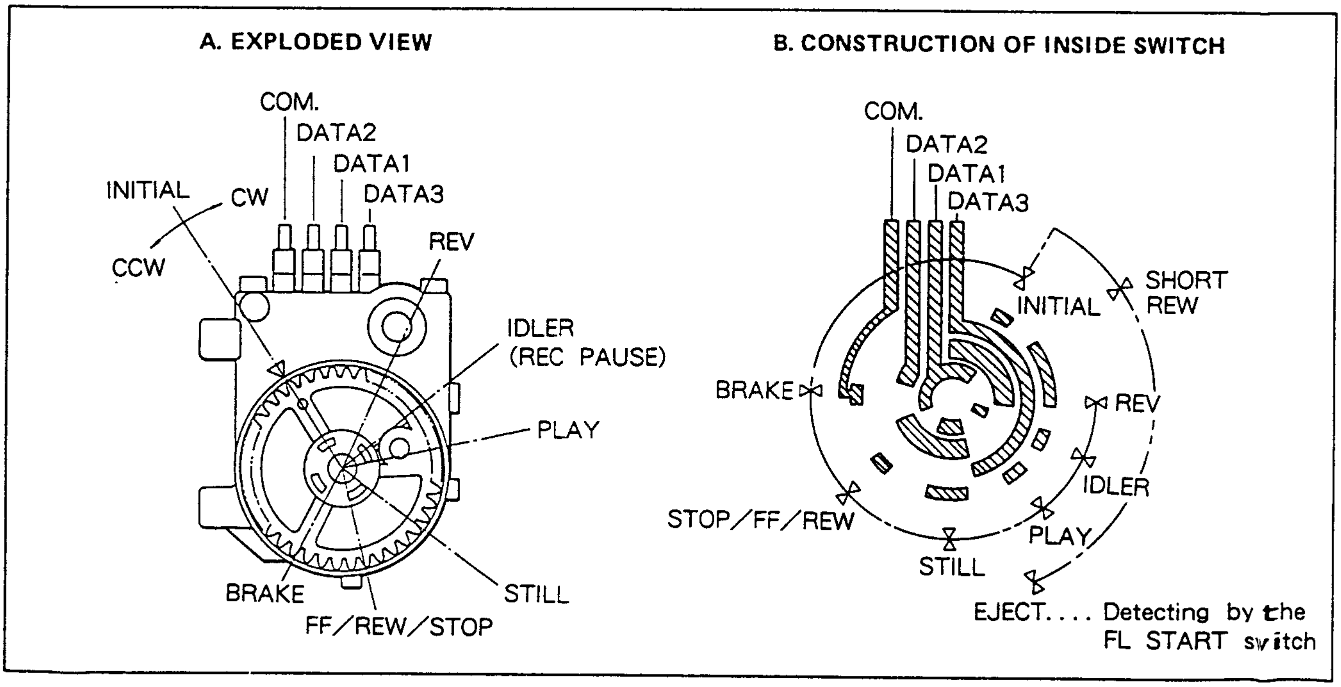

A. EXPLODED VIEW
COM.
DATA2
DATA1
DATA3
INITIAL
CW
CCW
REV
IDLER
(REC PAUSE)
PLAY
BRAKE
STILL
FF/REW/STOP
B. CONSTRUCTION OF INSIDE SWITCH
COM.
DATA2
DATA1
DATA3
SHORT
REW
INITIAL
BRAKE
REV
IDLER
STOP/FF/REW
PLAY
STILL
EJECT.... Detecting by the
FL START switch

Fig. 3-1 MECHANISM MODE SWITCH (ROTARY SWITCH)

4. MECHANISM MAINTENANCE AND CHECKING

4-1. PERIODIC CHECKING AND MAINTENANCE ITEMS AND SERVICE JIGS

The following maintenance and periodic checking procedures are recommended to ensure proper operation, and to protect the tape from dirt and damage. Also, these procedures should always be followed after repairing the unit.

4-1-1. Periodic Check Items

○ Cleaning ◎ Confirmation △ Lubrication

Part	Usage Time (hours)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape Guide System	Tape running surfaces	○	○	○	○	○	○	○	○	○	○	
	ACE head	○	○	○	○	○	○	○	○	○	○	
	Drum (cylinder)	○	○	○	○	○	○	○	○	○	○	Head life depends heavily on operating conditions.
Drive System	Loading belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Reel drive belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Intermediate gear, pulley axles		△		△		△		△		△	Absolutely avoid oil on tape running surfaces.
	Capstan axles		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Perfor-mance Check	Back tension torque		◎		◎		◎		◎		◎	47 ± 5 gcm
	Brake system		◎		◎		◎		◎		◎	
	FF, REV, PLAY torque		◎		◎		◎		◎		◎	FF : 600 gcm and over REW: 750 gcm and over REV : 150 to 240 gcm PLAY : 100 to 160 gcm

Note : The back tension torque is the value that has been measured by the cassette torque meter (VHJ-0016).
The torque of FF, REV, REW, and PLAY represent those measured with them locked by the torque gauge.
FF and REW are values 2 seconds after starting.

4-1-2. Cleaning

① Drum (COMPL CYLINDER) and Video Heads (See Fig. 4-1-1.)

1) Wrap a chamois leather around your finger and moisten it with methyl alcohol.
2) Move the chamois leather to left and right several times on the video head to clean. There is a video head also on the opposite side, so clean it likewise. In Hi-Fi models, clean the audio head also.
3) Clean the tape path surface of the cylinder in the same way.

Note: Always turn power off before cleaning. Do never move the chamois leather vertically or apply too much force to the head ; it may be damaged.

② Cleaning of the Tape Guide System (See Fig. 4-1-2.)

1) Set the EJECT mode and clean the tape guide system (tape guides, impedance roller, FTE head, ACE head, pinch rollers, capstan axles, etc.) with a chamois leather moistened with methyl alcohol.

Note: Make sure that no oil, grease, etc. adhere to the chamois leather and that heads are not damaged.

③ Cleaning of the Drive System

1) Clean the drive system (loading belt, reel drive belt, pulley, supply reel table, etc.) with a soft cloth moistened with methyl alcohol.

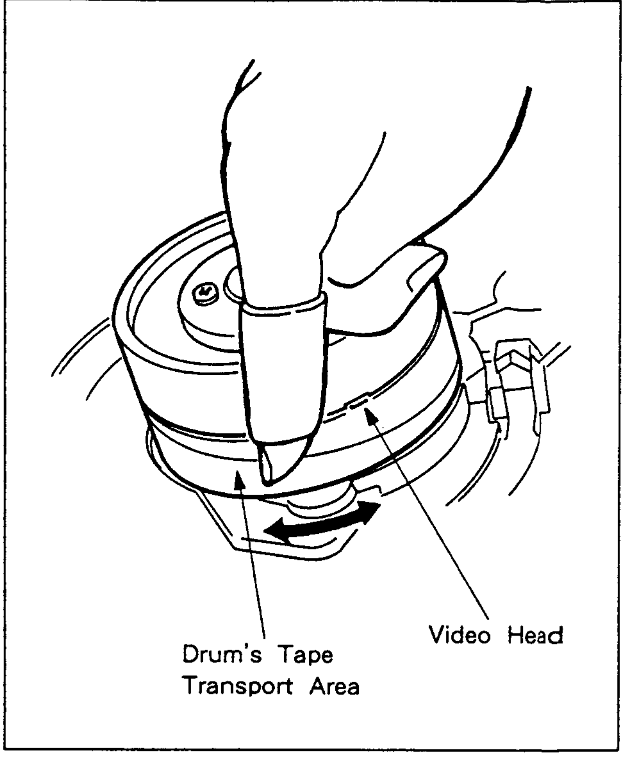

Video Head
Drum's Tape Transport Area

Fig. 4-1-1.

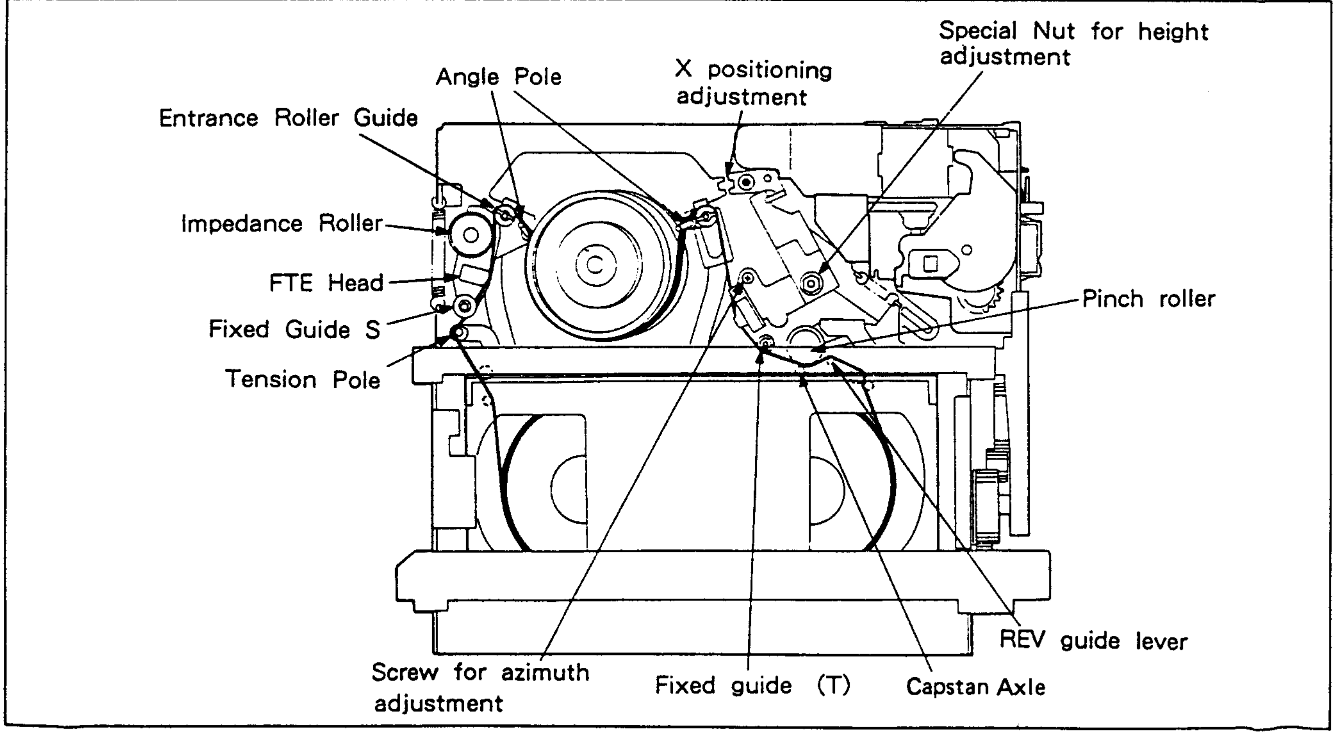
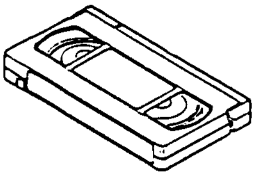

Special Nut for height adjustment
Angle Pole
X positioning adjustment
Entrance Roller Guide
Impedance Roller
FTE Head
Fixed Guide S
Tension Pole
Pinch roller
REV guide lever
Screw for azimuth adjustment
Fixed guide (T)
Capstan Axle

Fig. 4-1-2. Cleaning

4-1-3. Service Jigs

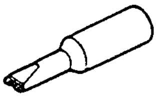
No.	Jig	Jig No.	Remarks
1	Alignment tape	VHJ-0008	SP color bar, 1kHz (normal)
2	Alignment tape	VHJ-0009	SP monoscope, 7kHz (normal)
3	Alignment tape	VHJ-0052	LP monoscope, 3kHz (normal)
4	Eccentric screwdriver	VHJ-0003	For tape path adjustment
5	Nut box	VHJ-0048	For tape path adjustment
6	Torque gauge	VHJ-0004	For reel take-up torque measurement
7	Cassette torquemeter	VHJ-0016	For back tension torque measurement
8	Position adjustment gauge	VHJ-0049	For position adjustment
9	Torque gauge screwdriver	VHJ-0014	For screw fastening torque adjustment
10	3mm dia. bit for torque screwdriver	VHJ-0045	Spare bit for the torque gauge screwdriver
11	Video head removing tool	VHJ-0041	For upper drum removal
12	Cassette stand plate gauge	VHJ-0001	For reel height adjustment
13	Mode selector	VHJ-0050	For mechanism mode selection
14	26-pin flexible flat cable	VHJ-0064	Spare cable for mode selector
15	Mode selector relay board	VHJ-0075	Relay board for mode selector
16	7-wire flat cable	VHJ-0076	Spare cable for relay board
17	REV guide lever removing tool	VHJ-0073	For REV guide lever removal
18	Fixed guide height gauge	VHJ-0053	For fixed guide (S) hight adjustment

VHJ-0008, VHJ-0009, VHJ-0052



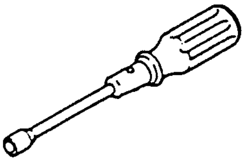
No. 1, 2, 3

VHJ-0003



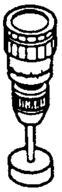
No. 4

VHJ-0048



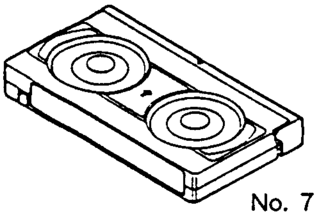
No. 5

VHJ-0004



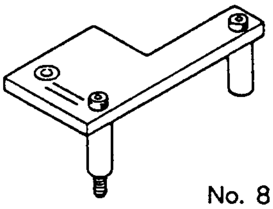
No. 6

VHJ-0016



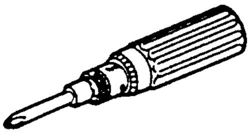
No. 7

VHJ-0049



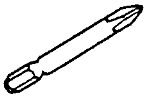
No. 8

VHJ-0014



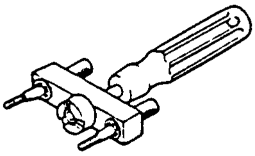
No. 9

VHJ-0045



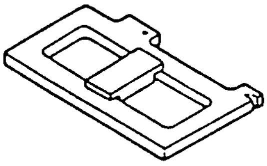
No. 10

VHJ-0041



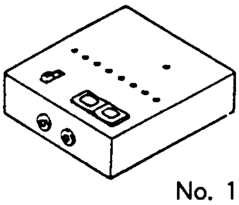
No. 11

VHJ-0001



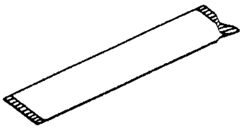
No. 12

VHJ-0050



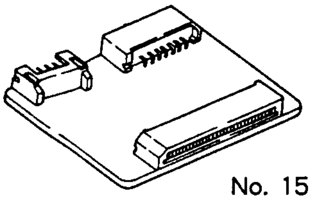
No. 13

VHJ-0064



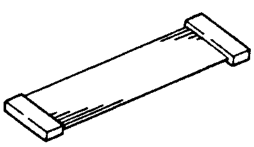
No. 14

VHJ-0075



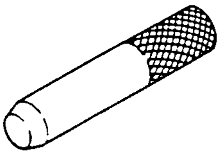
No. 15

VHJ-0076



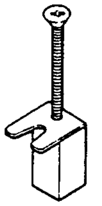
No. 16

VHJ-0073



No. 17

VHJ-0053



No. 18

4-2. MODE SELECTOR (VHJ-0050) HANDLING INSTRUCTIONS

The mode selector drives the loading motor of the P88 mechanism with its internal batteries (UM-2 × 4 = 6V), using LEDS to indicate the mode (EJECT, INITIAL, BRAKE, STOP/REW/FWD, STILL, PLAY, IDLER, REV) simultaneously with EJECT⇔REV mode changes.
Instead of the internal batteries, an external DC 6V power supply can also be used.

4-2-1. Part Names (See Fig. 4-2-1)

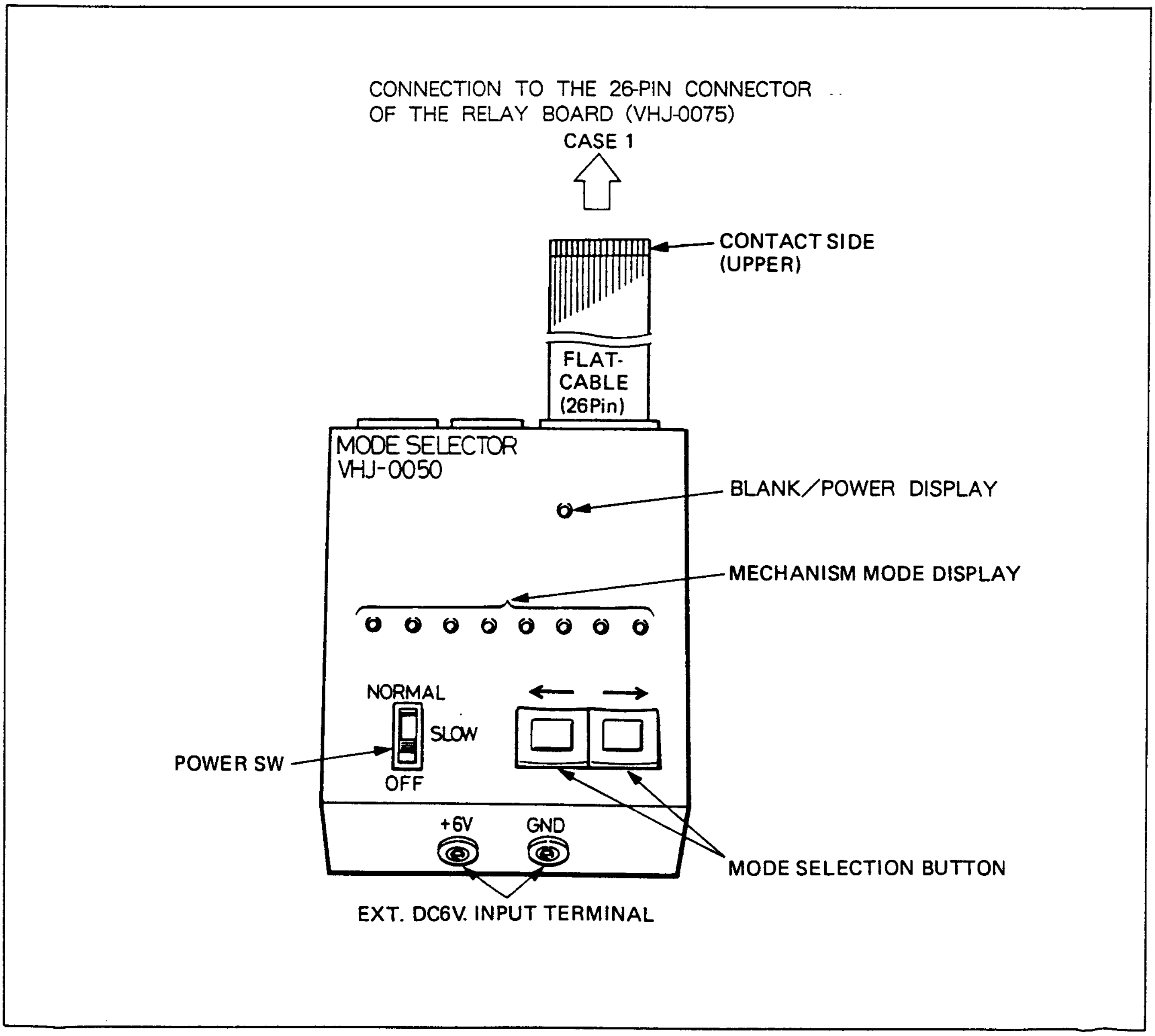

CONNECTION TO THE 26-PIN CONNECTOR OF THE RELAY BOARD (VHJ-0075)
CASE 1
CONTACT SIDE (UPPER)
FLAT-CABLE (26Pin)
MODE SELECTOR VHJ-0050
BLANK/POWER DISPLAY
MECHANISM MODE DISPLAY
NORMAL
SLOW
OFF
POWER SW
+6V
GND
MODE SELECTION BUTTON
EXT. DC6V. INPUT TERMINAL

Fig. 4-2-1

4-2-2. Connection Method (See Fig. 4-2-2)

1) Remove the 7-wire cable connected from the system control circuit to the connector (CN822) of the MC-3 board.
2) Connect the 7-wire cable (VHJ-0076) between the connector (CN822) of the MC-3 board and the 7-pin connector of the Mode Selector Connection Board (VHJ-0075).
3) Remove the 6-wire cable extending from the cassette holder section from the connector of the System Control Circuit Board and connect it to the 6-pin connector of the Mode Selector Connection Board (VHJ-0075).
4) Connect a supplied 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) between the mode selector body and the 26-pin connector of the Connection Board (VHJ-0075).

Note : Care should be taken to avoid mistaking the direction of the contacting side when connecting a flexible flat cable.

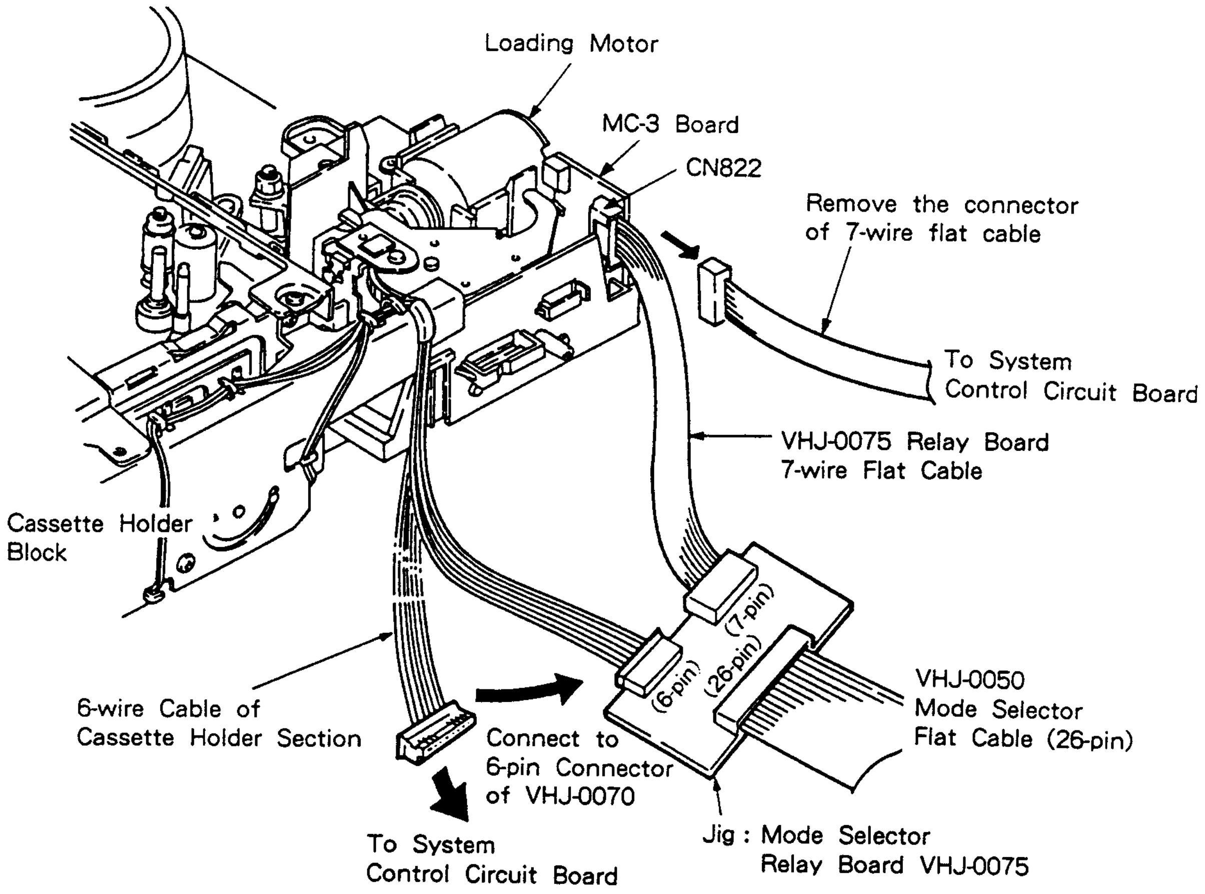

Loading Motor
MC-3 Board
CN822
Remove the connector of 7-wire flat cable
To System Control Circuit Board
VHJ-0075 Relay Board 7-wire Flat Cable
Cassette Holder Block
(7-pin)
(26-pin)
(6-pin)
VHJ-0050 Mode Selector Flat Cable (26-pin)
6-wire Cable of Cassette Holder Section
Connect to 6-pin Connector of VHJ-0070
To System Control Circuit Board
Jig : Mode Selector Relay Board VHJ-0075

Fig. 4-2-2 Connection

4-2-3. Handling Method

1) Keep the right side (⇨) of the mode selector key pressed, and the mode will change in the following sequence : EJECT⇨INITIAL⇨BRAKE⇨STOP/REW/FWD⇨STILL⇨PLAY⇨IDLER⇨REV.
2) When changing the mode in the REV···⇨EJECT direction, press the left side (⇦) of the mode selector key until the desired mode is indicated.
3) In the mid position of each mode during a shift to other mode, the "BLANK" LED lights. But the "PLAY", "IDLER", "REV" LEDs light between the EJECT mode and the INITIAL mode. Be sure therefore to check the mechanism body to see just what state the mechanism is in.
   Incidentally, if the mode selector is not connected to the mechanism, the "BLANK" LED lights to indicate the power ON.
4) The SLOW position of POWER switch makes relatively slow motions in comparison with the NORMAL position.

Note 1 : The mode selector drives the loading motor only, not affecting the head drum motor and the capstan motor. When using the mode selector with a cassette loaded, turn the capstan motor manually to remove tape slackness, preventing tape entanglement.

Note 2 : If the left side (⇦) of the mode selector (VHJ-0050) key is kept pressed with the COMPL cassette mechanism removed, it might get past the EJECT position, causing the front helical gear and the front worm gear to get disengaged.

In this condition, since the front helical gear will not turn even if the right side (⇨) of the mode selector key is pressed, rotate (push) the front helical gear clockwise by hand and engage it with the front worm gear. In this condition, as there is a misalignment between the mechanism main body operation mode (indicated by the mode selector indicator lamps) and the front loading mechanism operation mode, keep the right side (⇨) of the mode selector key pressed until the front helical gear and the front loading gear of the front loading mechanism get back to the initial condition (Refer to A and B in Fig. 4-5-5 of section 4-5-2. Loading Motor).

When the front loading mechanism returns to the initial condition, operation mode of the whole mechanism gets back to normal, matching the mode shown by the mode selector indicator lamps (mode is not properly indicated, however, during EJECT to INITIAL).

Sometimes, engagement of the front helical gear with the front worm gear is delayed, operation mode of the mechanism main body gets too much ahead and the front loading mechanism mode cannot be switched to the initial condition. In that case, press the left side (⇦) of the mode selector key, setting the mechanism main body operation mode back to EJECT (rotation of the mode cam and the MAIN CAM stops).

Note 3 : The mode selector indicator lamps show the mechanism operation mode, but the EJECT lamp may sometimes fail to indicate the actual mechanism operation mode.

5. MECHANISM DISMANTLING AND REASSEMBLING

5-1. MECHANISM MAIN UNIT (See Fig. 5-1-1.)

1. Removal

1) Remove the connectors of the COMPL MC-3 and the COMPL HEAD BRACKET.
2) Remove the flexible cable ① connecting the COMPL CYLINDER to the PRE-AMP UNIT ③ (See Fig. A).
3) Remove the two screws ②, then remove the PRE-AMP UNIT ③.
4) Remove the screw ④, then remove the PRE-AMP. BRACKET ⑤.
5) Remove the two screws ⑥.
6) Remove the three screws ⑦ and two screws ⑩, then lift up the mechanism main unit and remove it.
   Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws. (See Fig. B)

Note : Shape of the PRE-AMP UNIT ③ and the PRE-AMP. BRACKET ⑤ differ depending on the model.

2. Remounting

1) Mount the mechanism main unit onto the chassis with the three screws ⑦ and two screws ⑩.
2) Tighten the two screws ⑥.
3) Mount the PRE-AMP. BRACKET ⑤ with the two screws ④.
4) Mount the PRE-AMP UNIT ③ and the ground lug with the two screws ② (some models are not provided with a ground lug).
5) Insert the flexible cable ① into the connector of the PRE-AMP UNIT.
6) Connect the connectors of COMPL MC-3 and COMPL HEAD BRACKET.

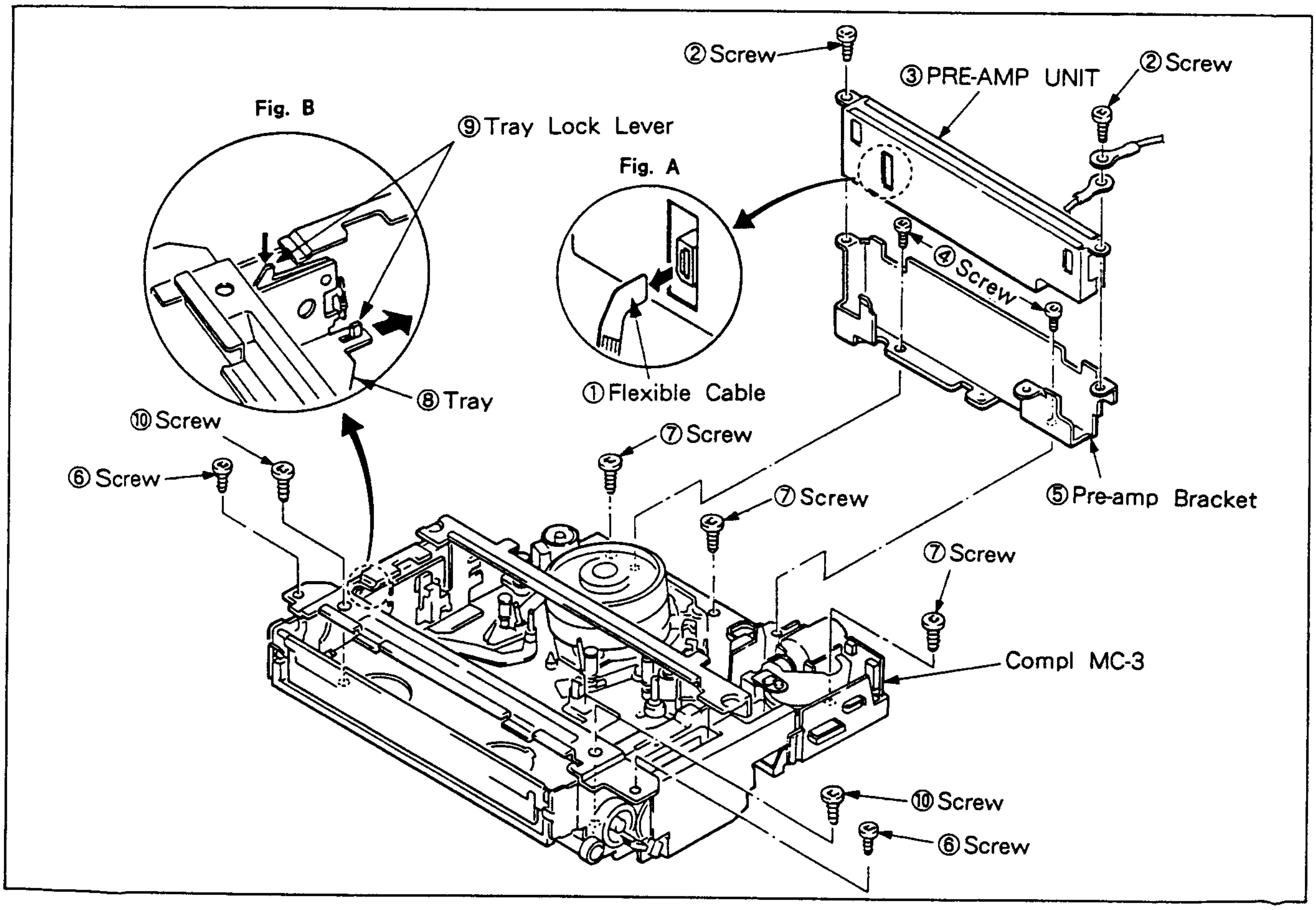

②Screw
③PRE-AMP UNIT
②Screw
Fig. B
⑨Tray Lock Lever
Fig. A
④Screw
①Flexible Cable
⑧Tray
⑩Screw
⑥Screw
⑦Screw
⑦Screw
⑤Pre-amp Bracket
⑦Screw
Compl MC-3
⑩Screw
⑥Screw

Fig. 5-1-1 Mecahnism Main Unit

5-2. CASSETTE HOLDER MECHANISM

5-2-1. COMPL Cassette Mechanism (See Fig. 5-2-1.)

1. Removal

1) Set the video main unit to the EJECT completed mode.
2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
3) Remove the two screws ①.
4) Remove the two screws ②.
5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front (See Fig. B). When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting

1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from above, match the front loading gear hole ⑤ with the MOTOR HOLDER hole ⑥ as shown in Fig. A).
2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance.
   Match positions of the FRONT LOADING GEAR △ mark ⑦ and the RACK EJECT mark ⑧. (See Fig. A.)
4) Fix to the mechanism chassis with the two screws ②.
5) Fix to the chassis with the screw ①.
6) Connect to the various connectors.

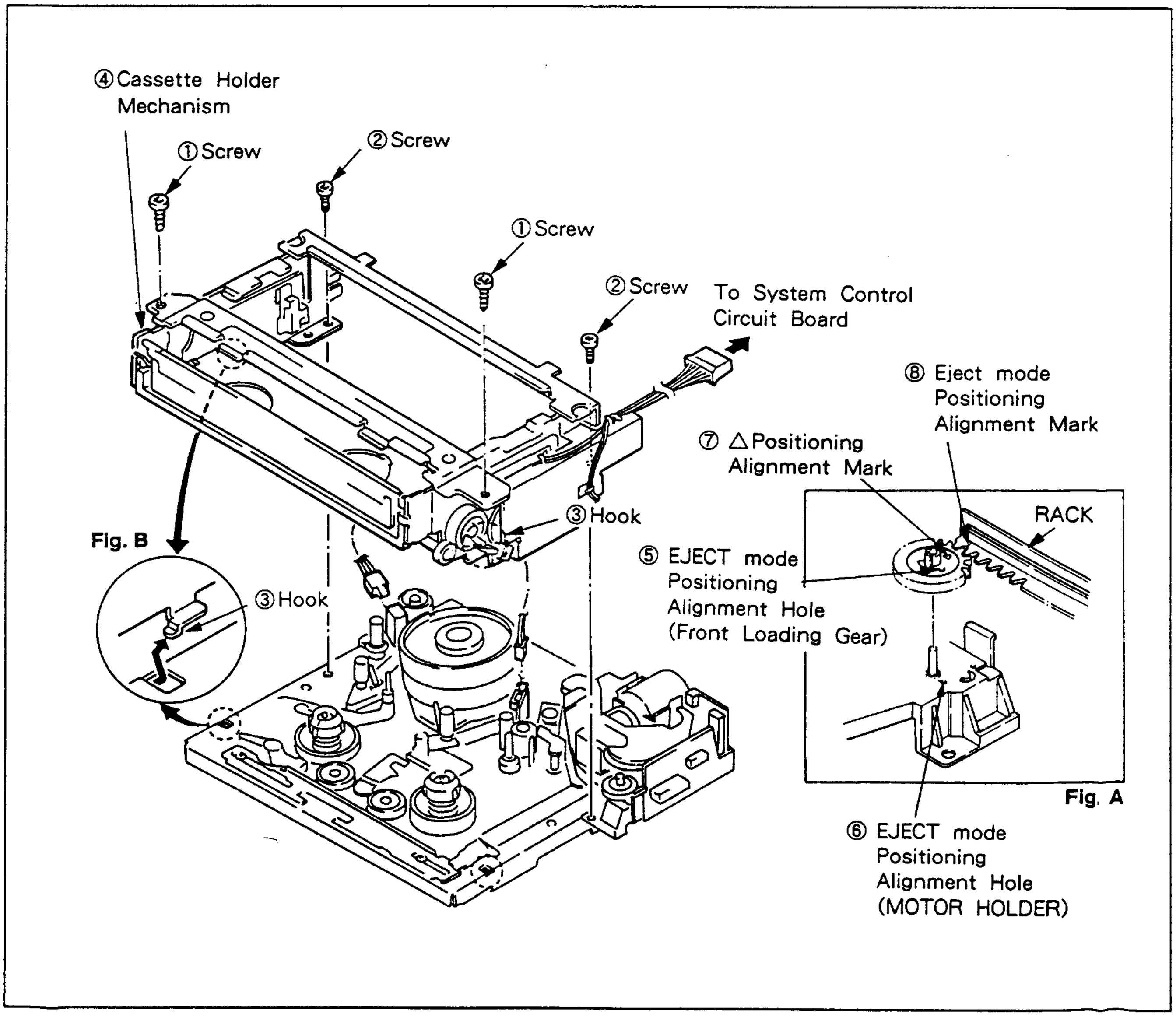

④Cassette Holder Mechanism
①Screw
②Screw
①Screw
②Screw
To System Control Circuit Board
⑧ Eject mode Positioning Alignment Mark
⑦ △Positioning Alignment Mark
RACK
③Hook
Fig. B
③Hook
⑤ EJECT mode Positioning Alignment Hole (Front Loading Gear)
Fig. A
⑥ EJECT mode Positioning Alignment Hole (MOTOR HOLDER)

Fig. 5-2-1 Compl Cassette Mechanism

5-2-2. Gear Bracket Ass'y (See Fig. 5-2-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the four screws ①, then remove the GEAR BRACKET ASS'Y ②.
3) Remove the E ring ③, then remove the LOCK GEAR ④, the PINION LEVER ASS'Y ⑤, the PINION GEAR ⑥ and the RACK ⑦, in that order.

2. Remounting

1) Apply grease to the shaft ⑧ and the two pins ⑨ of the GEAR BRACKET ASS'Y.
2) Apply grease to the pin ⑩ of the PINION LEVER ASS'Y.
3) Apply grease to the toothed part of the RACK ⑦.
4) Fit the RACK ⑦ onto the two pins ⑨. Match position of the hole ⑪ to the GEAR BRACKET hole ⑫.
5) Mount the PINION GEAR ⑥, PINION LEVER ASS'Y ⑤, and LOCK GEAR ④ in the shaft ⑧ in the order mentioned.
   Set the hole ⑬ of the PINION GEAR and the LOCK GEAR with the hole ⑪ of the RACK for proper positioning at that time.
6) Mount them in E-ring shaft.
7) Set the GEAR BRACKET ASS'Y ② to the dowel and mount it using four screws ①.
   Set the hole Ⓐ of the IDLER GEAR with the hole Ⓑ of the SIDE BOARD as shown in Fig. 5-2-3 at this time.
   Also set the hole ⑬ of the PINION GEAR and the LOCK GEAR with the hole ⑫ of the GEAR BRACKET by referring to Fig. 5-2-2. After mounting them, check to be sure that FL START SWITCH ⑭ is in the ON state shown in Fig. A.
8) Remount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

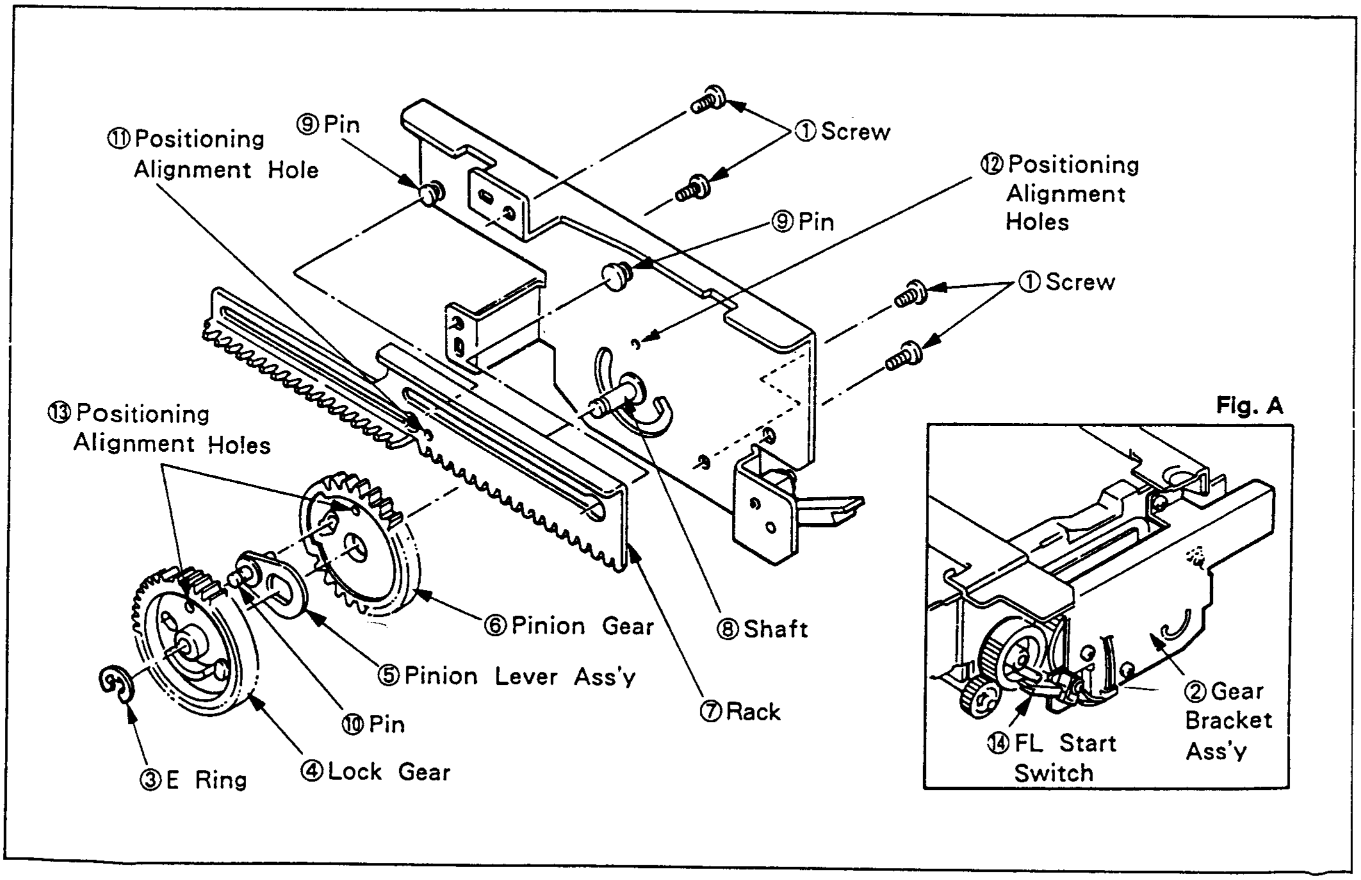

⑪ Positioning Alignment Hole
⑨ Pin
① Screw
⑫ Positioning Alignment Holes
⑨ Pin
① Screw
⑬ Positioning Alignment Holes
⑥ Pinion Gear
⑧ Shaft
⑤ Pinion Lever Ass'y
⑦ Rack
⑩ Pin
③ E Ring
④ Lock Gear
Fig. A
② Gear Bracket Ass'y
⑭ FL Start Switch

Fig. 5-2-2. Gear Bracket Ass'y

5-2-3. Cassette Drive Gear (Right) (See Fig. 5-2-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in 5-2-1. and 5-2-2., respectively.
2) Remove the IDLER GEAR ①.
3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.
5) Open the hook ⑥ and remove the COUPLE GEAR R ⑦. Take care not to open the hook ⑥ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the IDLER GEAR R ⑧.

2. Remounting

1) Apply grease to gear parts that undergo friction.
2) Mount the IDLER GEAR R ⑧ onto the axle ⑨.
3) Mount the COUPLE GEAR R ⑦ onto the ROD ASS'Y axle ⑩. When doing so, match the couple gear position with the IDLER GEAR R ⑧ as shown in Fig. A.
4) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Match position to the IDLER GEAR R ⑧ as shown in Fig. A.
5) Mount the E ring ④ onto the axle ⑫.
6) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, match position to the IDLER GEAR R ⑧ as shown in Fig. A.
7) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR R ③ and the LEVER GEAR ASS'Y R.
8) Mount the IDLER GEAR ① onto the axle ⑭. When doing so, match position to the MAIN GEAR as shown in Fig. A.
9) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM ASS' Y as instructed in 5-2-2. and 5-2-1., respectively.

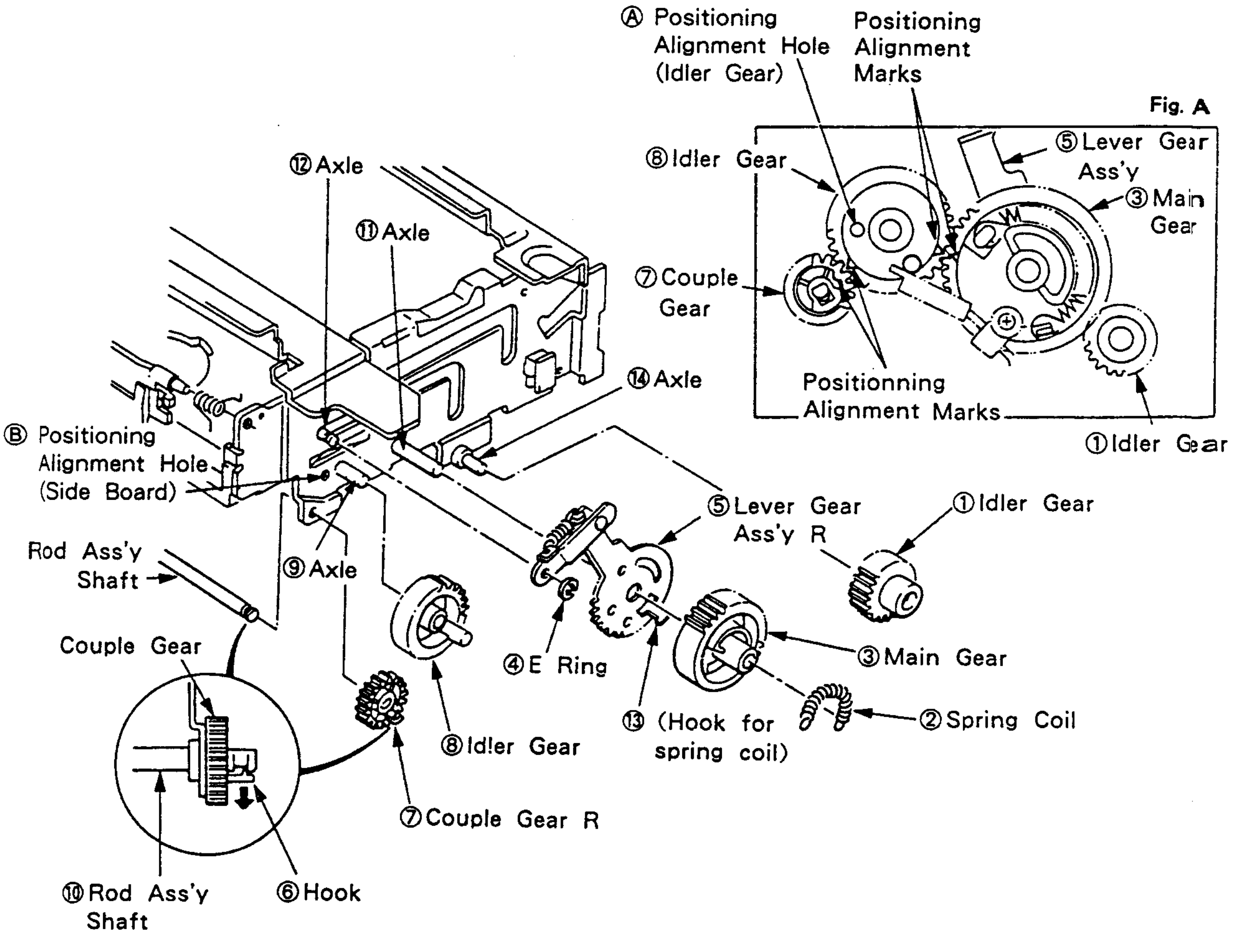

Ⓐ Positioning Alignment Hole (Idler Gear)
Positioning Alignment Marks
Fig. A
⑧ Idler Gear
⑤ Lever Gear Ass'y
③ Main Gear
⑦ Couple Gear
Positionning Alignment Marks
① Idler Gear
⑫ Axle
⑪ Axle
⑭ Axle
Ⓑ Positioning Alignment Hole (Side Board)
Rod Ass'y Shaft
⑨ Axle
⑤ Lever Gear Ass'y R
① Idler Gear
Couple Gear
④ E Ring
③ Main Gear
⑬ (Hook for spring coil)
② Spring Coil
⑧ Idler Gear
⑦ Couple Gear R
⑩ Rod Ass'y Shaft
⑥ Hook

Fig. 5-2-3. Cassette Drive Gears (Right Side)

5-2-4. Cassette Drive Gear (Left) (See Fig. 5-2-4)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COUPLE GEAR R as instructed in 5-2-3.
3) Remove the ROD ASS'Y ①.
4) Remove the E ring ②.
5) Remove the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y ④.
7) Remove the IDLER GEAR L ⑥ and the DOOR OPEN LEVER ⑦.

2. Remounting

1) Apply grease to the axles ⑧, ⑨ and ⑩.
2) Apply grease to the IDLER GEAR L ⑥.
3) Mount the DOOR OPEN LEVER ⑦ onto the axle ⑧. Do it so that the end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.
4) Mount the IDLER GEAR L ⑥ onto the axle ⑧.
5) Pass the ROD ASS'Y ① through the hole ⑫. Match position of the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig B.
6) Mount the COUPLE GEAR R as instructed in 5-2-3.
7) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
8) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Match position to the IDLER GEAR L ⑥ as shown in Fig. B.
9) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in 5-2-1.

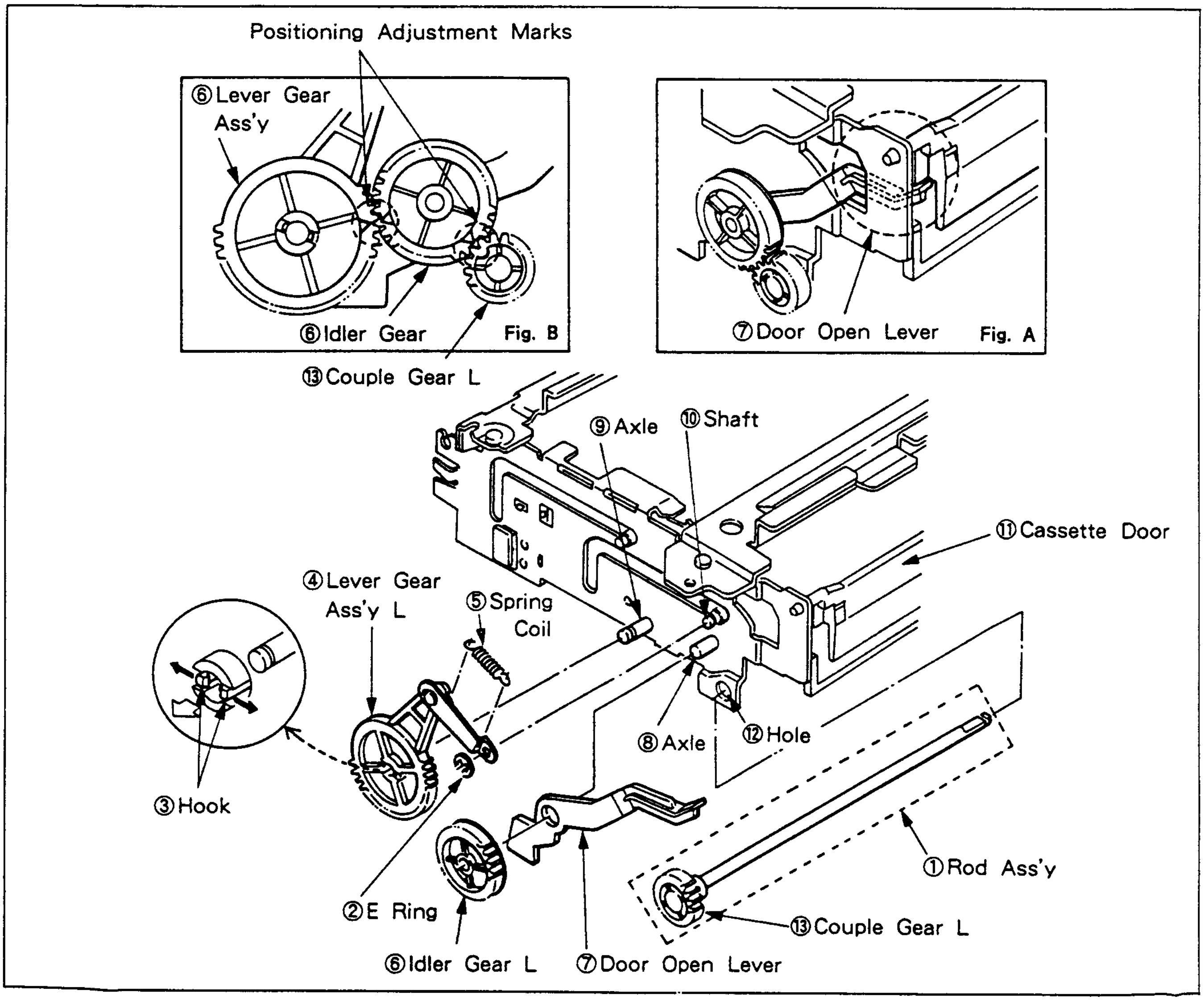

Positioning Adjustment Marks
⑥Lever Gear Ass'y
⑥Idler Gear
Fig. B
⑬Couple Gear L
⑦Door Open Lever
Fig. A
⑨Axle
⑩Shaft
⑪Cassette Door
④Lever Gear Ass'y L
⑤Spring Coil
③Hook
⑧Axle
⑫Hole
①Rod Ass'y
②E Ring
⑬Couple Gear L
⑥Idler Gear L
⑦Door Open Lever

Fig. 5-2-4. Cassette Drive Gears (Left Side)

5-2-5. FL Start Switch (See Fig. 5-2-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the screw ①.
3) Remove the lead wire of the FL START SWITCH ②.

2. Remounting

1) Solder the lead wire to the FL START SWITCH ② terminal.
2) Align the FL START SWITCH ② protuberance to the hole ⑤, then mount it onto the GEAR BRACKET ASS'Y ③ with the screw ①. Do it so that the FL START SWITCH ② is turned ON by holding the pin ④ of IDLER GEAR in the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

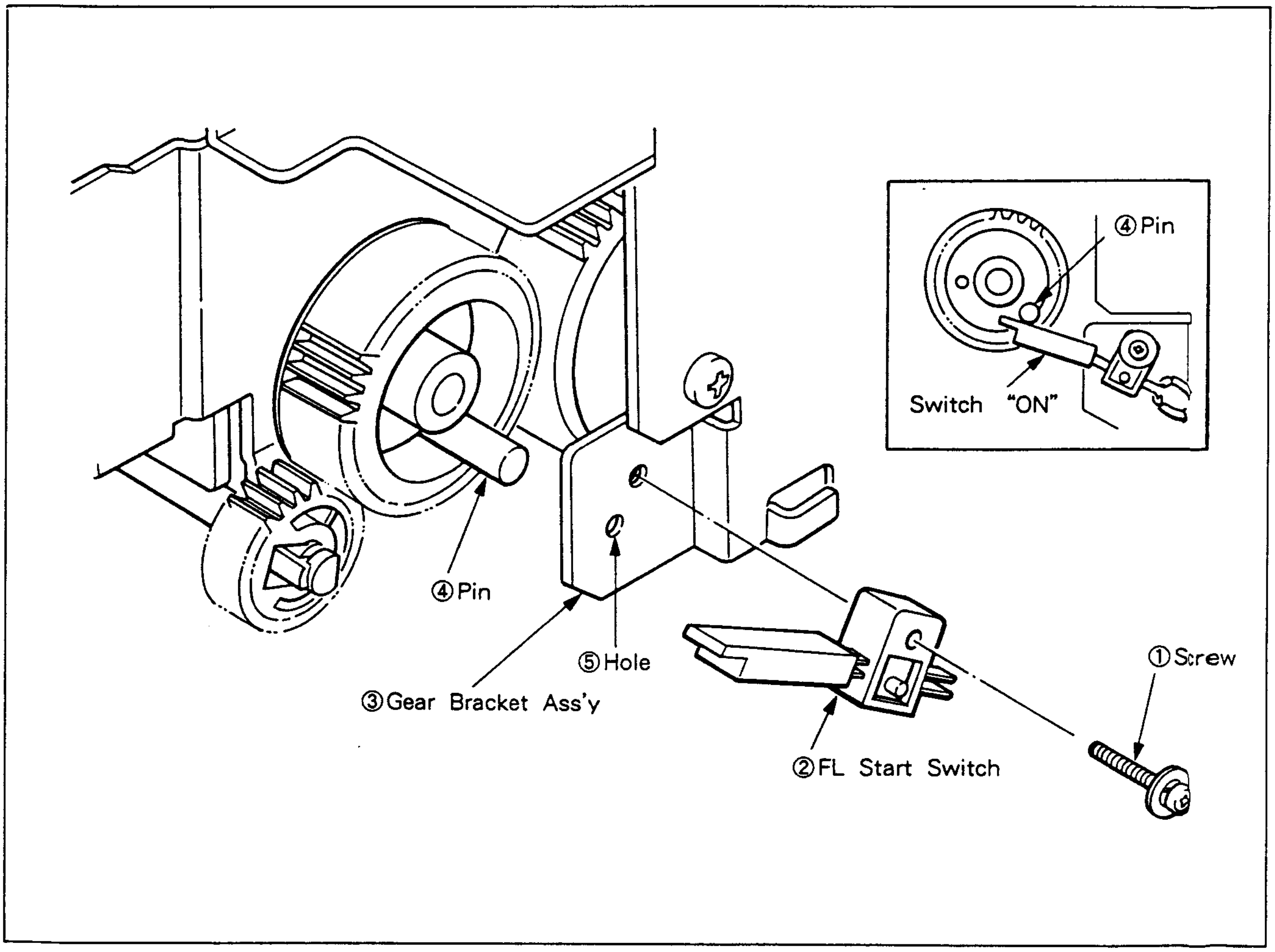

④Pin
Switch "ON"
④Pin
⑤Hole
③Gear Bracket Ass'y
①Screw
②FL Start Switch

Fig. 5-2-5. FL Start Switch

5-2-6. T-Top Sensor, T-End Sensor (See Fig. 5-2-6.)

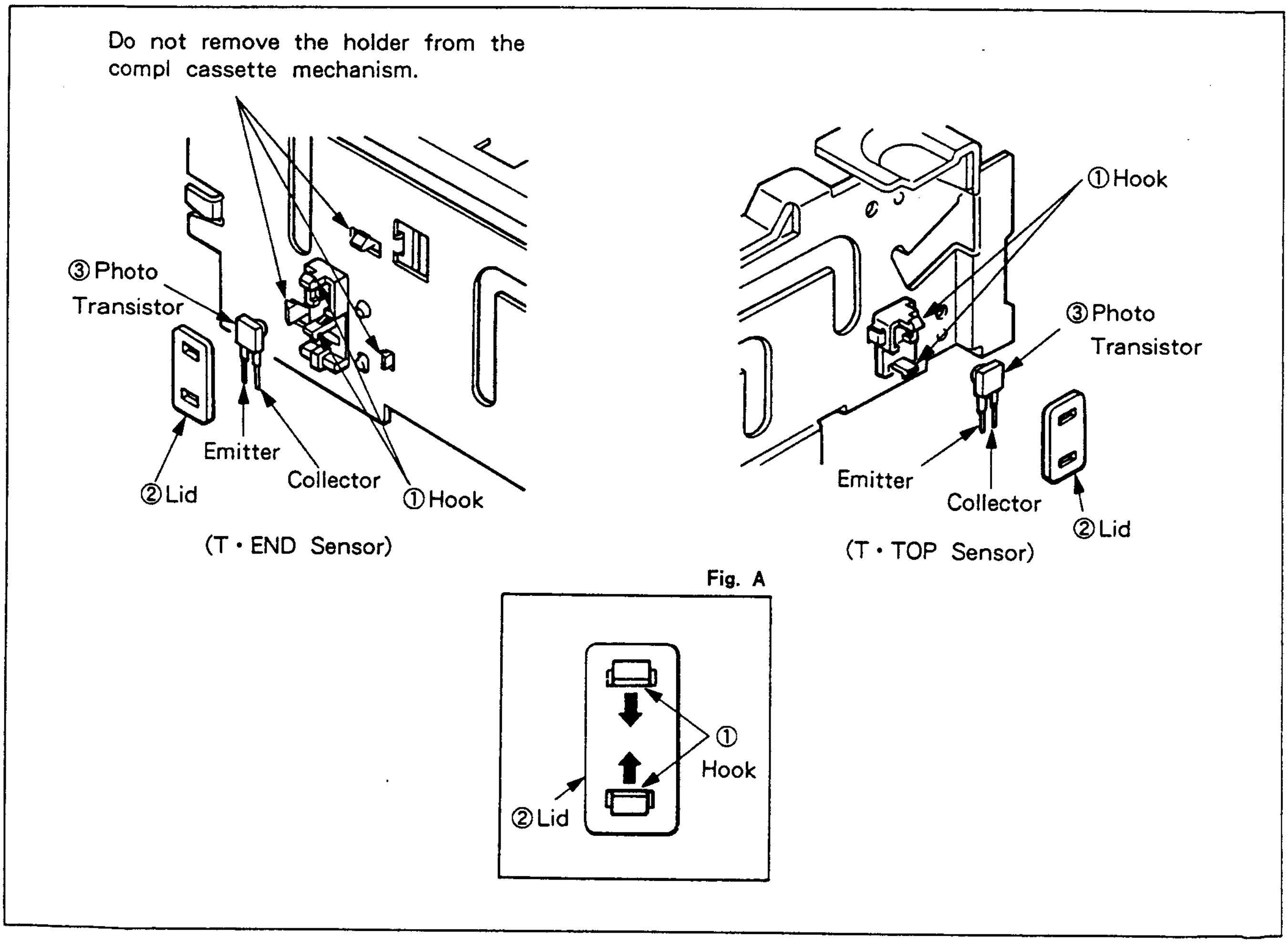
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) When removing the T-TOP SENSOR, remove the GEAR BRACKET ASS'Y as instructed in 5-2-2.
3) Unhook the hook ① as instructed in Fig. A, then remove the LID ②. Take care not to push the hook ① too much, otherwise it may be deformed or broken.
4) Remove the phototransistors ③, then remove the lead wire.

Note : Mounting position of the transistor holder on the T-END SENSOR side is precisely adjusted at the factory, so do never remove it from the COMPL CASSETTE MECHANISM.

2. Remounting

1) Solder the brown lead wire to the emitter side, and the red lead wire to the collector side of the T-TOP SENSOR phototransistor ③.
   Solder the orange lead wire to the emitter side, and the yellow lead wire to the collector side of the T-END SENSOR phototransistor.
2) Mount the phototransistors ③ onto their respective holders.
3) Mount the LID ② and fix it with the hook ①.
4) Mount the GEAR BRACKET ASS'Y as instructed in 5-2-2.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.


Do not remove the holder from the compl cassette mechanism.

③Photo Transistor
Emitter
Collector
②Lid
①Hook
(T • END Sensor)
①Hook
③Photo Transistor
Emitter
Collector
②Lid
(T • TOP Sensor)
Fig. A
①
Hook
②Lid

Fig. 5-2-6. T TOP Sensor & T END Sensor

5-3. COMPL HOLDER MOTOR (LOADING MOTOR BLOCK)

5-3-1. COMPL Motor Bracket

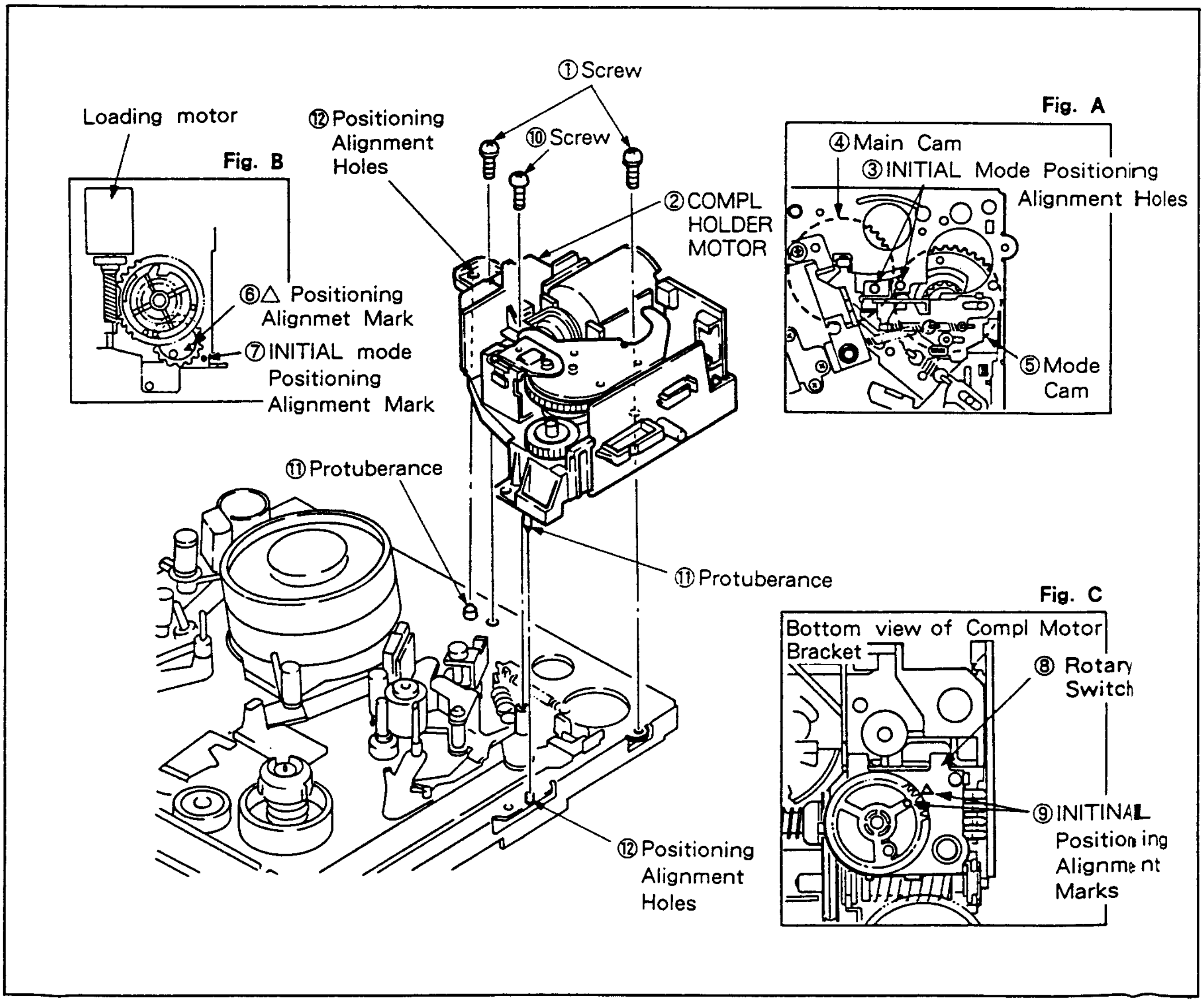
1. Removal

1) Remove the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.
2) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
3) Remove the two screws ① and the other one ⑩, then remove the COMPL HOLDER MOTOR ② (see Fig. 5-3-1.).

2. Remounting

1) Set the mechanism chassis to the INITIAL mode. In this mode, look at the mechanism chassis positioning holes ③ just from above and align the MAIN CAM ④ and MODE CAM ⑤ positioning holes as shown in Fig. A.
2) Set the COMPL HOLDER MOTOR ② to the INITIAIL mode with the mode selector (VHJ-0050). In this position, the FRONT LOADING GEAR △ mark ⑥ is aligned with the MOTOR HOLDER INITIAL mode position mark ⑦ (see Fig. B.).
3) Align the ROTARY SWITCH (mode detector switch) ⑧ with the INITIAL mode position mark ⑨ (see Fig. C.).
4) Align the COMPL HOLDER MOTOR main unit ② with the protuberance ⑪, then mount it with the two screws ① and the other one ⑩.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
6) Mount the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.

Note : Normal mechanism operation cannot be achieved if initial positioning of the MAIN CAM ④, the MODE CAM ⑤ and the ROTARY SWITCH (mode detector switch) ⑧ are not performed precisely.



①Screw
Loading motor
Fig. B
⑫Positioning Alignment Holes
⑩Screw
②COMPL HOLDER MOTOR
⑥△ Positioning Alignmet Mark
⑦INITIAL mode Positioning Alignment Mark
⑪Protuberance
⑪Protuberance
⑫Positioning Alignment Holes
Fig. A
④Main Cam
③INITIAL Mode Positioning Alignment Holes
⑤Mode Cam
Fig. C
Bottom view of Compl Motor Bracket
⑧ Rotary Switch
⑨INITINAL Positioning Alignment Marks

Fig. 5-3-1 Compl Holder Motor

5-3-2. Loading Motor (Refer to Fig. 5-3-2.)

1. Removal

LOADING MOTOR can be replaced after LOADING MOTOR BLOCK unit has been removed by referring to 5-3-1. The 1990 version of the mechanism allows LOADING MOTOR itself to be replaced without removing CASSETTE HOLDER BLOCK and LOADING MOTOR BLOCK. The following describes this procedure.

1) Use MODE SELECTOR (VHJ-0050) to set the mechanism to the initial mode.
2) Remove the connector for DEW SENSOR connected to the MC-3 board ①.
3) Remove three screws ② and remove HOLDER BRACKET ④ with FRONT WORM ASS'Y ③ still attached.
4) Remove DAMPER ⑥ attached to the pulley of LOADING MOTOR ⑤.
5) Remove FRONT HELICAL GEAR ⑦ and WASHER ⑧.
6) Remove soldered LEAD WIRE from the terminal of LOADING MOTOR ⑤.
7) Remove LOADING BELT ⑨.
8) Remove LOADING MOTOR ⑤ by lifting up from the back terminal side.

2. Remounting

Before attaching LOADING MOTOR ⑤ to MOTOR BRACKET ASS'Y ⑩, confirm DAMPER ⑪ and DAMPER ⑫ shown in Fig. 5-3-5. are in the proper position on MOTOR BRACKET ASS'Y ⑩.

1) LOADING MOTOR ⑤ puts REAR SIDE BOSS ㉓ in the slit ㉔ of MOTOR HOLDER ⑩.
   Further, mount the tap hole ⑬ at two points of the front pulley side so that the it is secured to the PROTUBERANCE ⑭ of the MOTOR HOLDER at two points.
2) Solder the lead wire from the MC-3 board to LOADING MOTOR ⑤ terminal. (Solder the red lead wire to the positive terminal side.)
3) Hang LOADING BELT ⑨ on the pulley.
4) After hanging BELT ⑨ on the pulley, confirm that the mechanism unit is in the initial mode. The initial mode is indicated by Fig. A of Fig. 5-3-2., and is the position in which INITIAL POSITIONING ALIGNMENT HOLEs of MAIN CAM ⑮ and MODE CAM ⑯ are lined up with THROUGH HOLE ⑰ of MOTOR HOLDER. If the initial mode is not selected, adjust with MODE SELECTOR (VHJ-0050).
5) As shown in Fig. B, confirm the positions of the △ POSITIONING ALIGNMENT MARK on FRONT LOAD GEAR ⑱ and INITIAL MARK ⑲ position of MOTOR HOLDER and the position relationship of CASSETTE HOLDER RACK ⑳.
6) Apply a light coat of grease to the entire sides of AXLE ㉑ and FRONT HELICAL GEAR ⑦.
7) Attach FRONT HELICAL GEAR ⑦ and WASHER ⑧ to AXLE ㉑. As shown in Fig. C, FRONT HELICAL GEAR ⑦ is attached so that the indent on the side is inside PIN ㉒ of FRONT LEVER ASS'Y.
8) Attach DAMPER ⑥ to LOADING MOTOR ⑤ pulley.
9) HOLDER BRACKET ④ is attached by engaging FRONT WORM ASS'Y ③ with LOADING MOTOR ⑤ pulley, and held in place with three screws ②.
10) Attach the connector of DEW SENSOR ㉕ to the MC-3 board ① and return the mechanism to the eject completion using MODE SELECTOR.

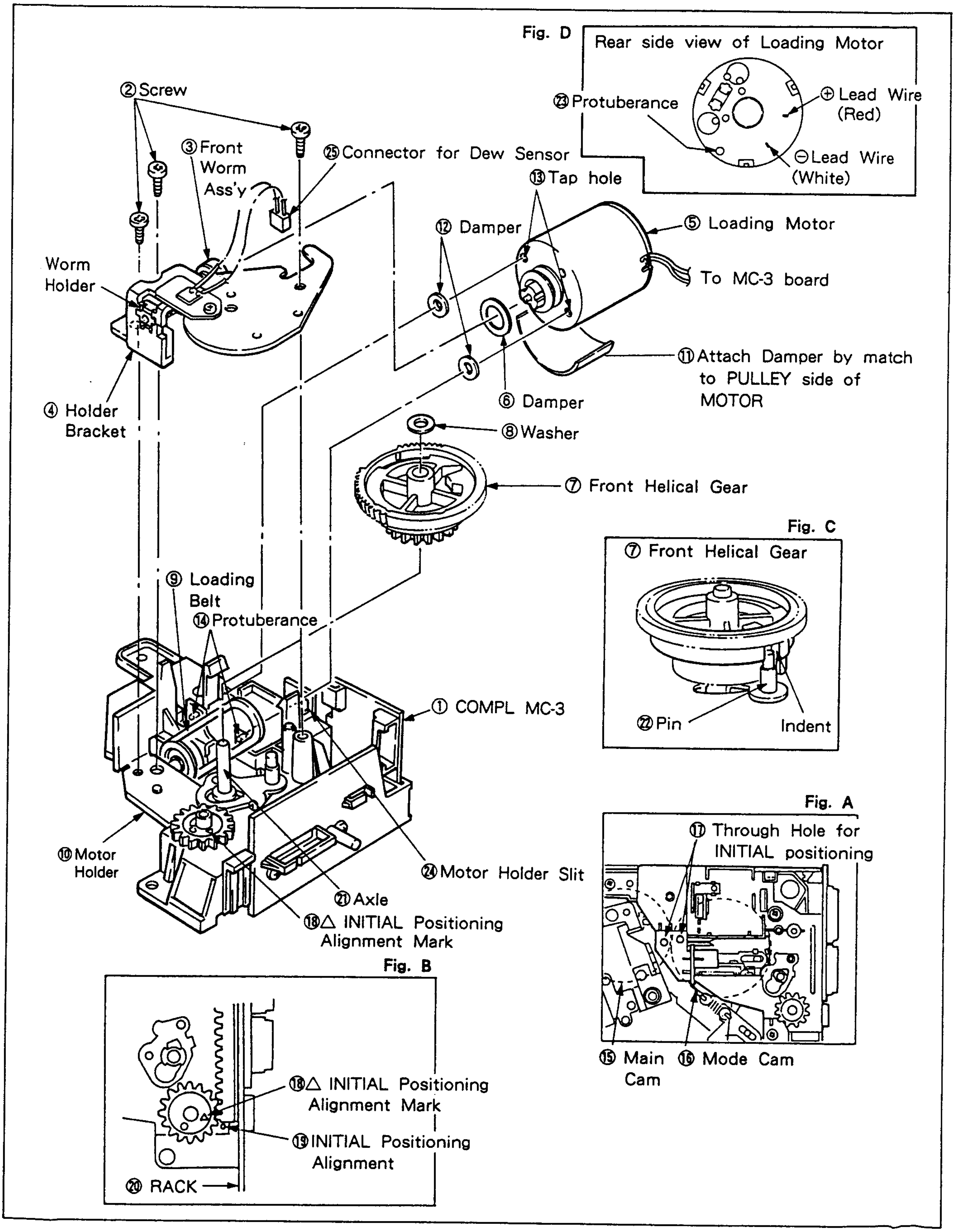


Fig. D
Rear side view of Loading Motor
㉓Protuberance
⊕Lead Wire (Red)
⊖Lead Wire (White)
②Screw
③Front Worm Ass'y
㉕Connector for Dew Sensor
⑬Tap hole
Worm Holder
⑫ Damper
⑤ Loading Motor
To MC-3 board
⑪Attach Damper by match to PULLEY side of MOTOR
④ Holder Bracket
⑥ Damper
⑧Washer
⑦ Front Helical Gear
Fig. C
⑦ Front Helical Gear
㉒Pin
Indent
⑨ Loading Belt
⑭Protuberance
① COMPL MC-3
Fig. A
⑰ Through Hole for INITIAL positioning
⑩Motor Holder
㉔Motor Holder Slit
㉑Axle
⑱△ INITIAL Positioning Alignment Mark
⑮ Main Cam
⑯ Mode Cam
Fig. B
⑱△ INITIAL Positioning Alignment Mark
⑲INITIAL Positioning Alignment
⑳ RACK

Fig. 5-3-2. Loading Motor

5-4. TAPE LOADING MECHANISM

5-4-1. Main Parts of the Tape Loading Mechanism (See Fig. 5-4-1.)

1. Removal

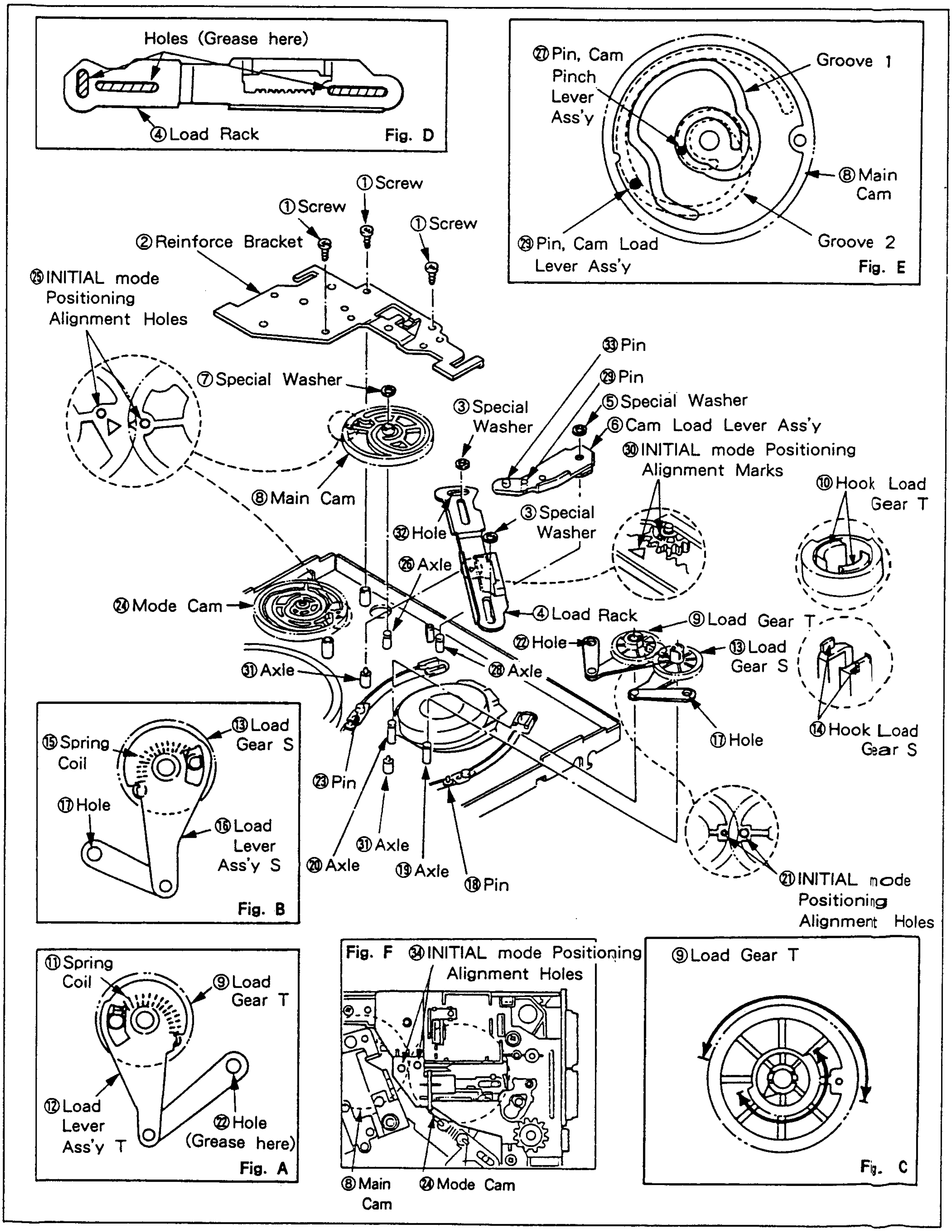
1) Remove connectors from the DRUM MOTOR board (SV-5).
2) Remove the three screws ①, then remove the REINFORCE BRACKET ②.
3) Remove the two special washers ③, then remove the LOAD RACK ④.
4) Remove the special washer ⑤, then remove the CAM LOAD LEVER ASS'Y ⑥.
5) Remove the stop washer ⑦, then remove the MAIN CAM ⑧.
6) Unhook the LOAD GEAR T hook ⑩, then remove the LOAD GEAR T ⑨ as shown in Fig. A, with the SPRING COIL ⑪ and the LOAD LEVER ASS'Y T ⑫ attached to it.
7) Unhook the LOAD GEAR S hook ⑭, then remove the LOAD GEAR S ⑬ as shown in Fig. B, with the SPRING COIL S ⑮ and the LOAD LEVER ASS'Y S ⑯ attached to it.

Note : Take care not to open the LOAD GEAR hooks too much, otherwise they may be deformed or broken. If they are, replace them.

2. Remounting

1) Apply grease to the inner surface of the LOAD LEVER ASS'Y S ⑯ hole ⑰, as shown in Fig. B.
2) Apply grease to the inner surface of the LOAD LEVER ASS'Y T ⑫ hole ㉒ and to the section of the LOAD GEAR T ⑨ indicated with an arrow in Fig. C.
3) Apply grease to GROOVEs 1 and 2 of the MAIN CAM ⑧, and to the outer side of the teeth.
4) Apply grease to the three oval holes of the LOAD RACK ④ as shown in Fig. D.
5) Apply grease to the outer surface of axles ⑲⑳㉖ and ㉘.
6) After assembling as shown in Fig. B, mount the LOAD GEAR S ⑬ onto the axle ⑲. Insert the ROLLER BASE S pin ⑱ into the LOAD LEVER ASS'Y S hole ⑰.
7) After assembling as shown in Fig. A, mount the LOAD GEAR T ⑨ onto the axle ⑳. When doing so, set the LOAD GEAR S ⑬ and the LOAD GEAR T ⑨ to the INITIAL mode position ㉑. Insert the ROLLER BASE T pin ㉓ into the hole ㉒ of the LOAD LEVER ASS'Y T ⑫.
8) Mount the MAIN CAM ⑧ on the axle ㉖. At that time, make sure that the positioning hole ㉕ of the MAIN CAM ⑧ and the MODE CAM ㉔ matches the initial positioning hole ㉞ of the MECHANISM CHASSIS. Also check to be sure that the Pin ㉗ of the CAM PINCH LEVER ASSEMBLY is put in the groove ① of the MAIN CAM as shown in Fig. E.
9) Mount the special washer ⑦ to the axle ㉖.
10) Mount the CAM LOAD LEVER ASS'Y ⑥ onto the axle ㉘. Insert the pin ㉙ into the MAIN CAM GROOVE 2 as shown in Fig. E.
11) Mount the special washer ⑤ onto the axle ㉘.
12) Set the LOAD RACK ④ to the INITIAL mode position ㉚ with the LOAD GEAR T ⑨, and mount onto the two axles ㉛. Insert the CAM LOAD LEVER ASS'Y pin ㉝ into the hole ㉜.
13) Mount the two special washers ③ onto the two axles ㉛.
14) Mount the REINFORCE BRACKET ② with the three screws ①.
15) Insert the connector into the DRUM MOTOR board (SV-5).
16) Confirm that loading and unloading are performed smoothly.

Note : Be sure to perform INITIAL mode positioning of cams and gears precisely.


Holes (Grease here)
④Load Rack
Fig. D
㉗Pin, Cam Pinch Lever Ass'y
Groove 1
⑧Main Cam
㉙Pin, Cam Load Lever Ass'y
Groove 2
Fig. E
①Screw
①Screw
①Screw
②Reinforce Bracket
㉕INITIAL mode Positioning Alignment Holes
⑦Special Washer
⑧Main Cam
㉝Pin
㉙Pin
⑤Special Washer
⑥Cam Load Lever Ass'y
③Special Washer
㉚INITIAL mode Positioning Alignment Marks
⑩Hook Load Gear T
㉜Hole
③Special Washer
㉖Axle
㉔Mode Cam
④Load Rack
⑨Load Gear T
㉒Hole
⑬Load Gear S
㉛Axle
㉘Axle
⑰Hole
⑭Hook Load Gear S
⑬Load Gear S
⑮Spring Coil
⑰Hole
⑯Load Lever Ass'y S
Fig. B
㉓Pin
㉛Axle
⑳Axle
⑲Axle
⑱Pin
㉑INITIAL mode Positioning Alignment Holes
⑪Spring Coil
⑨Load Gear T
⑫Load Lever Ass'y T
㉒Hole (Grease here)
Fig. A
Fig. F
㉞INITIAL mode Positioning Alignment Holes
⑧Main Cam
㉔Mode Cam
⑨Load Gear T
Fig. C

5-4-1. Loading Mechanism Main Parts

5-4-2. Mode Cam (See Fig. 5-4-2.)

1. Removal

1) Set the INITIAL mode with the mode selector (VHJ-0050).
2) Remove the REINFORCE BRACKET as instructed in 5-4-1.
3) Remove the two stop washers ①, then remove the CAM PLATE SLIDE ASS'Y ②.
4) Remove the MODE CAM ③.

2. Remounting

1) Referring to 5-4-1., confirm that the MAIN CAM is in the INITIAL mode position.
2) In case the MAIN CAM is misplaced, use the mode selector (VHJ-0050) to align the MAIN CAM positioning hole with the chassis INITIAL mode position hole (refer to 5-4-1. for the INITIAL mode position). Since the ROTARY SWITCH (mode detector switch) does not rotate, the mode selector indicator lamp will not show the correct mode.
3) Align the ROTARY SWITCH (mode detector switch) ④ with the INITIAL mode position mark ⑤ as shown in Fig. A.
4) Mount the MODE CAM ③ onto the axle ⑥. Do it so that the SLIDE CAM ASS'Y pin ⑪ is placed in the GROOVE 3 as shown in Fig. B.
5) Mount the CAM PLATE SLIDE ASS'Y ② onto the axles ⑥ and ⑦. Do it so that the pin ⑧ gets into the GROOVE 4 of the MODE CAM as shown in Fig. B, and the point ⑨ of the bent-up part into the ACT PLATE SLIDE ASS'Y hole ⑩.
6) Mount the two special washers ① onto the axles ⑥ and ⑦.
7) Mount the REINFORCE BRACKET as instructed in 5-4-1.

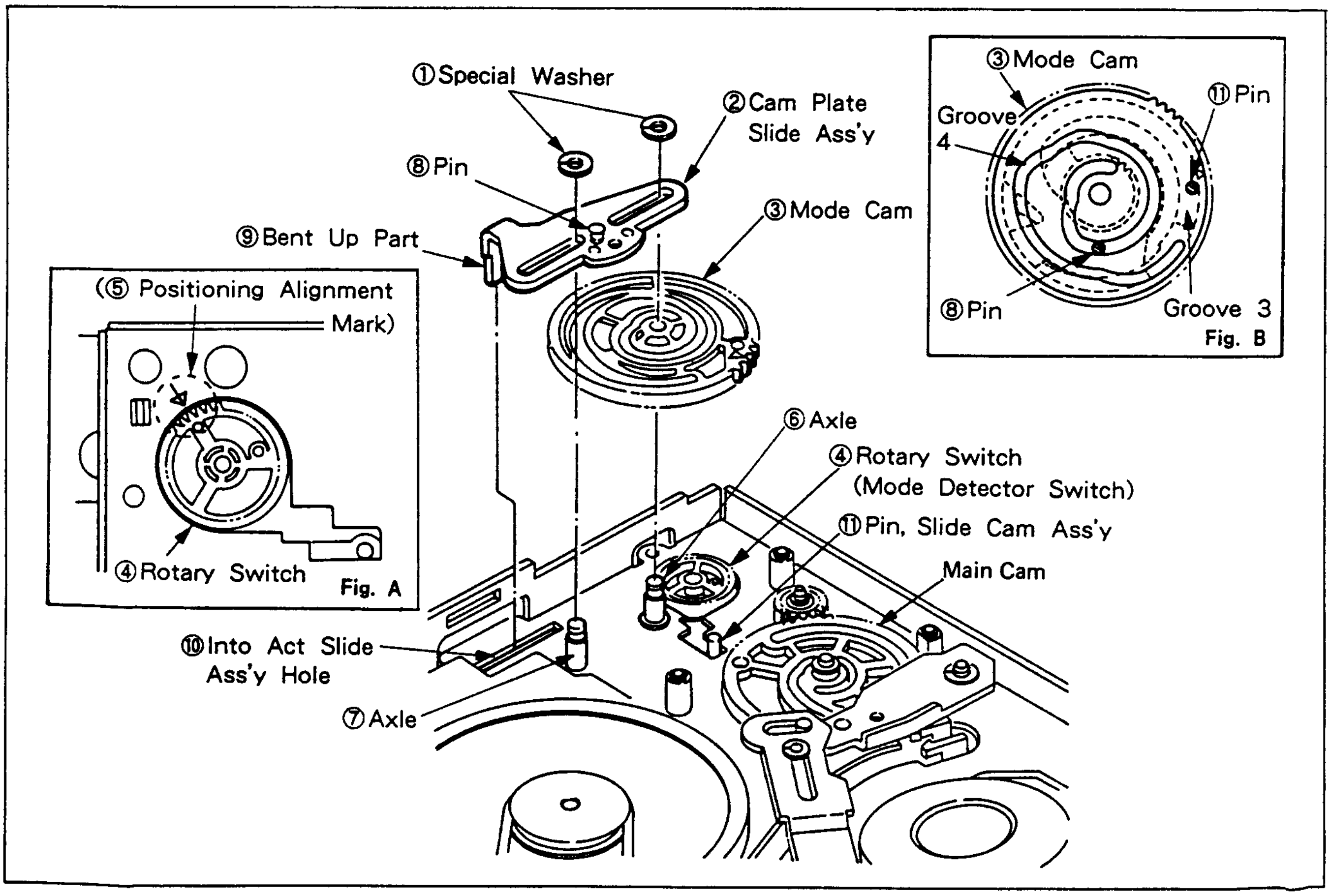

①Special Washer
②Cam Plate Slide Ass'y
⑧Pin
③Mode Cam
⑨Bent Up Part
(⑤ Positioning Alignment Mark)
④Rotary Switch
Fig. A
⑥Axle
④Rotary Switch (Mode Detector Switch)
⑪Pin, Slide Cam Ass'y
Main Cam
⑩Into Act Slide Ass'y Hole
⑦Axle
③Mode Cam
Groove 4
⑪Pin
⑧Pin
Groove 3
Fig. B

Fig. 5-4-2. Mode Cam

5-5. COMPL HEAD BRACKET (ACE HEAD) (See Fig. 5-5-1.)

1. Removal

1) Remove the COMPL HEAD BRACKET special mounting nut ②.
2) Remove the SLEEVE ③, the COMPL HEAD BRACKET ① and the ACE HEAD SPRING COIL ④, in that order.

Note: Take care not to scratch or soil the ACE head surface.

2. Remounting

1) Apply grease to the axle ⑥ as shown in Fig. A.
2) Apply grease to the spot where the COMPL HEAD BRACKET ① makes contact with the STOPPER ⑦ (See Fig. A).
3) Mount the ACE HEAD SPRING COIL ④ and the COMPL HEAD BRACKET ①, in that order, onto the axle ⑥. Hook one end of the ACE HEAD SPRING COIL ④ to the notch ⑤, and the other end to the COMPL HEAD BRACKET, so that the COMPL HEAD BRACKET is pressed against the STOPPER ⑦ (See Fig. A).
4) Mount the SPECIAL NUT ② onto the axle ⑥ through the SLEEVE ③.
5) Clean the ACE head surface with a chamois leather moistened with methyl alcohol.
6) Perform ACE head adjustment as instructed in 6-4.

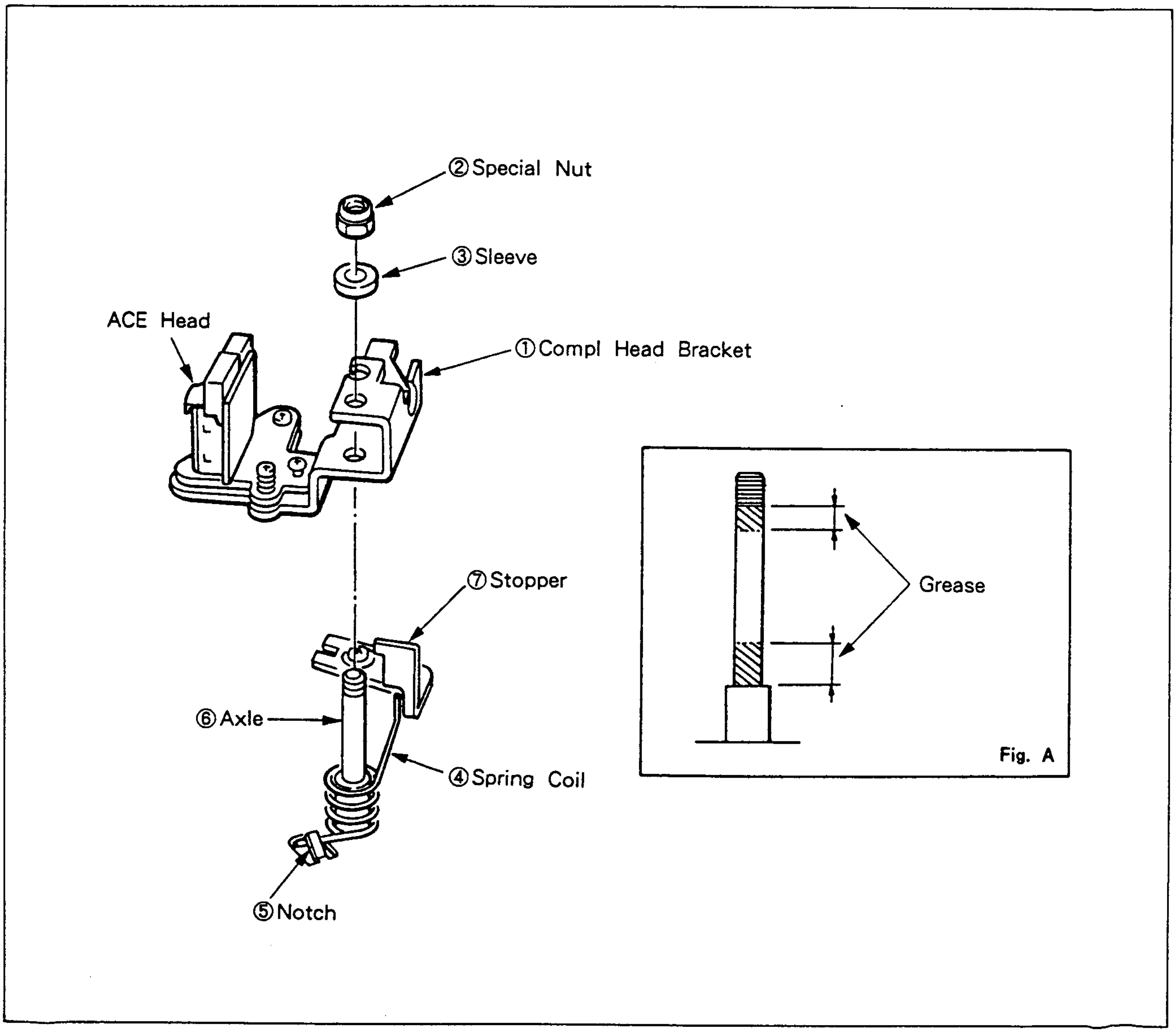

②Special Nut
③Sleeve
ACE Head
①Compl Head Bracket
⑦Stopper
⑥Axle
④Spring Coil
⑤Notch
Grease
Fig. A

Fig. 5-5-1. Compl Head Bracket (ACE Head)

5-6. PINCH ROLLER PRESSURE MECHANISM (See Fig. 5-6-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COMPL HEAD BRACKET as instructed in 5-5.
3) Remove the PINCH SPRING COIL ①.
4) Remove the special washer ②, then remove the PINCH LEVER ASS'Y ③.
5) Remove the REV GUIDE LEVER SPRING COIL ④.
6) Remove the REV GUIDE LEVER ASS'Y ⑥ from the hook ⑤ of the plastic molding bearing on the bottom side. Use a jig VHJ-0073 shown in Fig. 5-6-2 to widen the hook ⑤ of the plastic molding bearing. By so doing, the above removal of the REV GUIDE LEVER ASS'Y ⑥ can be made more easily. Care should be taken to avoid pushing the jig VHJ-0073 too much. Pushing it too hard may damage the hook in an extreme case.
7) Remove the LINK LOCK SPRING COIL ⑦.
8) Remove the special washer ⑧, then remove the PINCH CAM LEVER ASS'Y ⑨.
9) Remove the ACT PINCH SLIDE ASS'Y ⑩.

Note : If damaged the claw ⑤ of the plastic bearing, reference should be made to Section 3. "Method of Repairing the Bearing Section of REV GUIDE LEVER ASSEMBLY".

2. Remounting

1) Apply grease to pins ⑫/⑬ and axles ⑯/⑱.
2) Apply grease to the ACT PINCH SLIDE ASS'Y pin ⑰.
3) Set the INITIAL mode with the mode selector (VHJ-0050).
4) Mount the ACT PINCH SLIDE ASS'Y ⑩ onto pins ⑫ and ⑬.
5) Insert the pin ⑭ of the PINCH CAM LEVER ASS'Y ⑨ into the MAIN CAM ⑪ GROOVE 1, and mount onto the axle ⑯ while inserting the pin ⑰ of the ACT PINCH SLIDE ASS'Y into the hole ⑮.
6) Mount the special washer ⑧ onto the axle ⑯.
7) Hook the LINK LOCK SPRING COIL ⑦ to the PINCH CAM LEVER ASS'Y ⑨.
8) Mount the REV GUIDE LEVER ASS'Y ⑥ to the plastic molding bearing, then fix it with the hook ⑤ at the bottom.
9) Hook the REV GUIDE LEVER SPRING COIL ④.
10) Mount the PINCH LEVER ASS'Y ③ to the axle ⑱.
11) Mount the special washer ② to the axle ⑱.
12) Hook the PINCH SPRING COIL ① between the ACT PINCH SLIDE ASS'Y ⑩ and the PINCH LEVER ASS'Y ③.
13) Mount the COMPL HEAD BRACKET as instructed in 5-5.
14) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
15) Perform ACE head adjustment as instructed in 6-4.

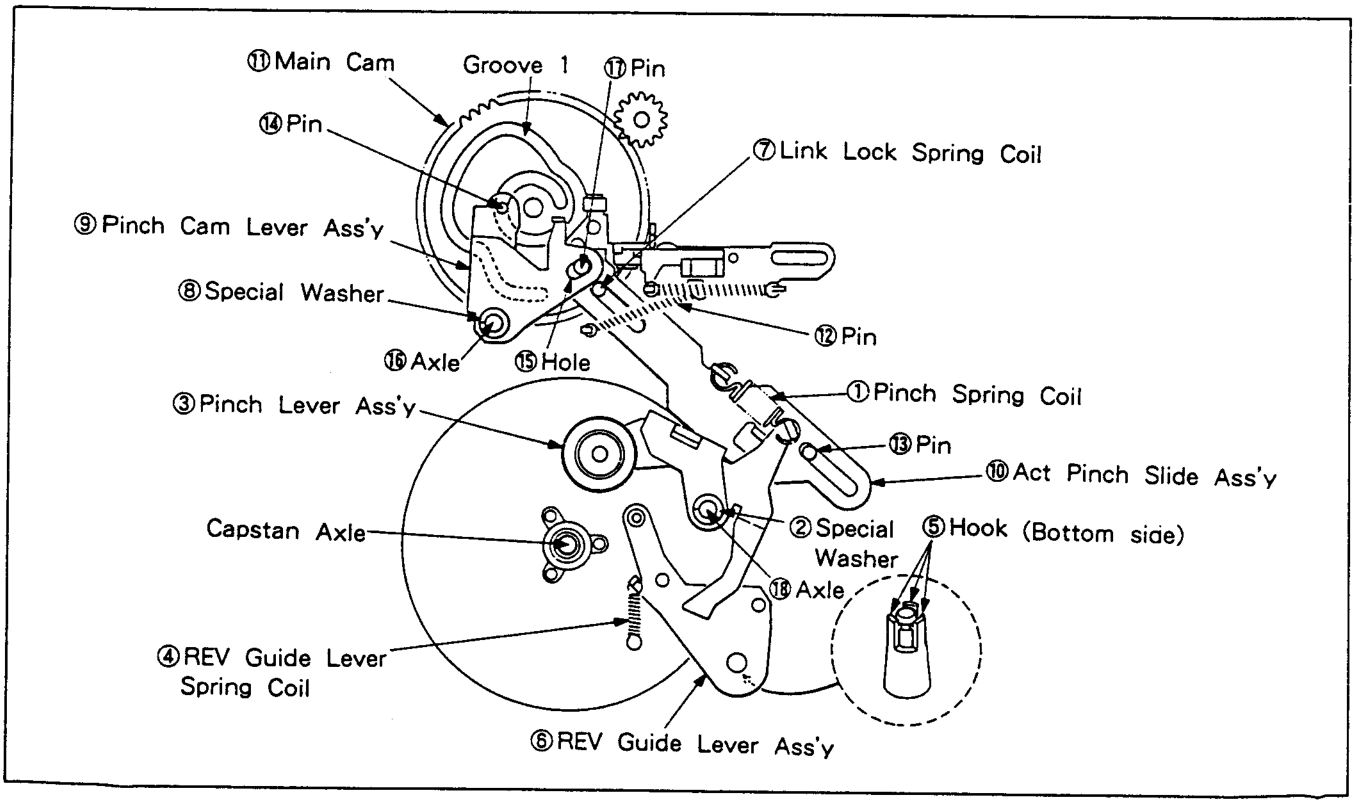
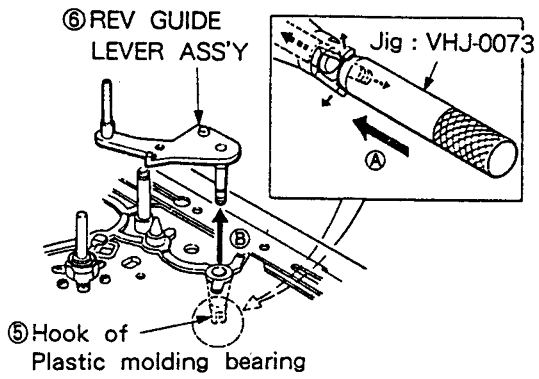

⑪Main Cam
Groove 1
⑰Pin
⑭Pin
⑦Link Lock Spring Coil
⑨Pinch Cam Lever Ass'y
⑧Special Washer
⑫Pin
⑯Axle
⑮Hole
③Pinch Lever Ass'y
①Pinch Spring Coil
⑬Pin
⑩Act Pinch Slide Ass'y
Capstan Axle
②Special Washer
⑤Hook (Bottom side)
⑱Axle
④REV Guide Lever Spring Coil
⑥REV Guide Lever Ass'y

Fig. 5-6-1. Pinch Roller Pressing Mechanism


⑥REV GUIDE LEVER ASS'Y
Jig : VHJ-0073
Ⓐ
Ⓑ
⑤Hook of Plastic molding bearing

Remove REV GUIDE LEVER ASS'Y in the direction of arrow Ⓑ, pushing VHJ-0073 slightly in the direction of arrow Ⓐ.
Be careful not to damage the hook by pushing too much.

Fig. 5-6-2 Method of Using the Jig VHJ-0073

3. Method of Repairing the Bearing Section of REV GUIDE LEVER ASSEMBLY

If the hook of the plastic molding bearing is damaged in the process of removing the REV GUIDE LEVER ASS'Y, proceed with the repair as follows :

1) Scrape the broken hook of the bearing section with a cutter knife and flatten it.
2) Insert the REV GUIDE LEVER ASS'Y in the bearing and fit a stopper washer in. The special washer to be used must be Part No. 411 109 1605. This stop washer (Part No. 411 109 1605) is the same as that used on SUPPLY REEL ASS'Y or TAKE-UP REEL ASS'Y.
   Remove the REV GUIDE LEVER ASSEMBLY toward an arrow B while pushing the jig VHJ-0073 lightly in the direction of an arrow.

Pushing the jig VHJ-0073 too much may cause hook breakage. Therefore, care should be taken.

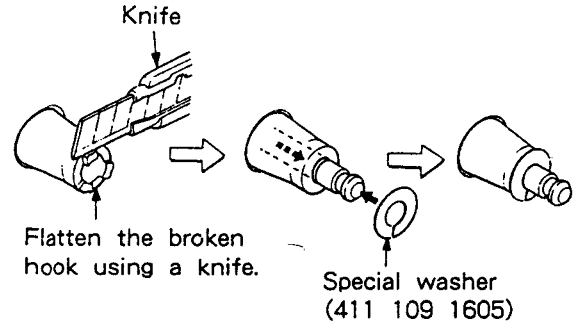

Knife
Flatten the broken hook using a knife.
Special washer (411 109 1605)

Fig. 5-6-3 Method of Repairing the Bearinig Section of the REV GUIDE LEVER ASSEMBLYE

5-7. BRAKE MECHANISM

5-7-1. Sub Take-up Brake Ass'y (See Fig. 5-7-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) While pushing the hook ② in the direction of arrow, remove the SUB TAKE-UP BRAKE ASS'Y ③.

2. Remounting

1) Mount the SUB TAKE-UP BRAKE ASS'Y ③ onto the pin ④. Confirm that the hook ② is firmly hooked to the chassis.
2) Fit the SPRING COIL between hooks ⑤ and ⑥.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

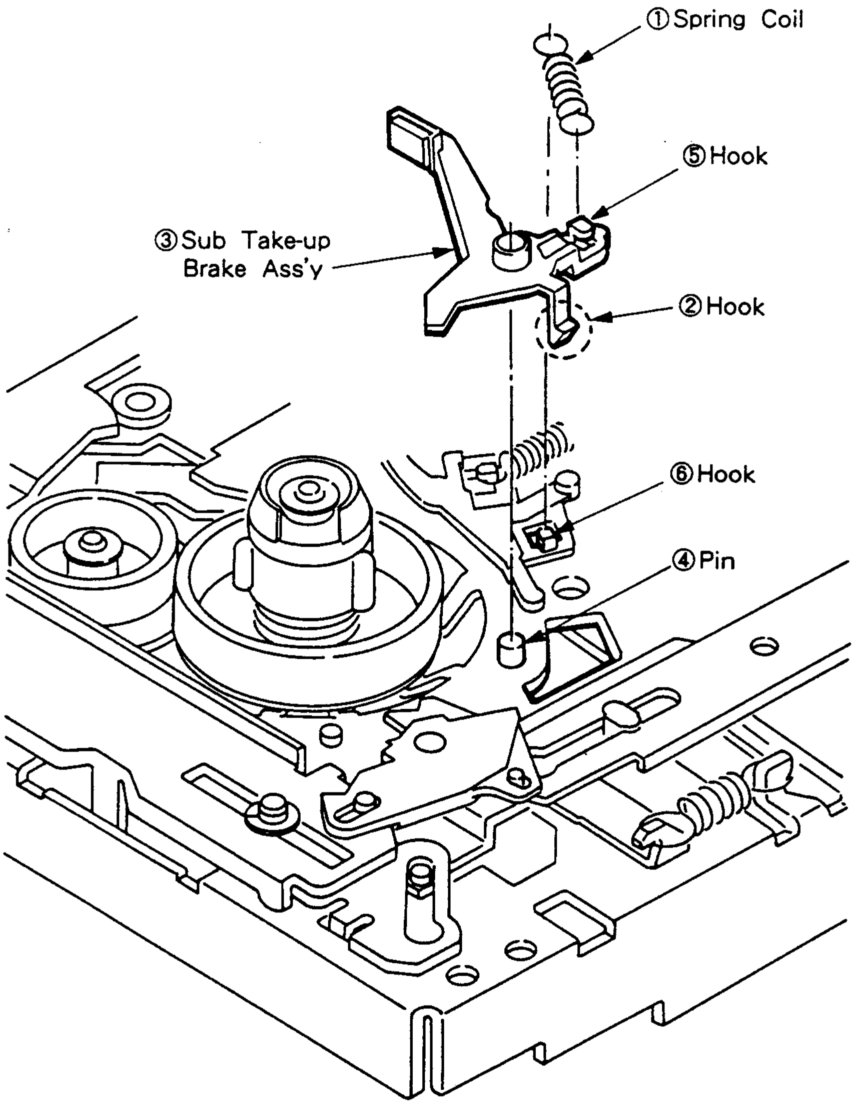

①Spring Coil
⑤Hook
③Sub Take-up Brake Ass'y
②Hook
⑥Hook
④Pin

Fig. 5-7-1. Sub Take-up Brake Ass'y

5-7-2. Supply Brake Ass'y and Take-up Brake Ass'y (See Fig. 5-7-2.)

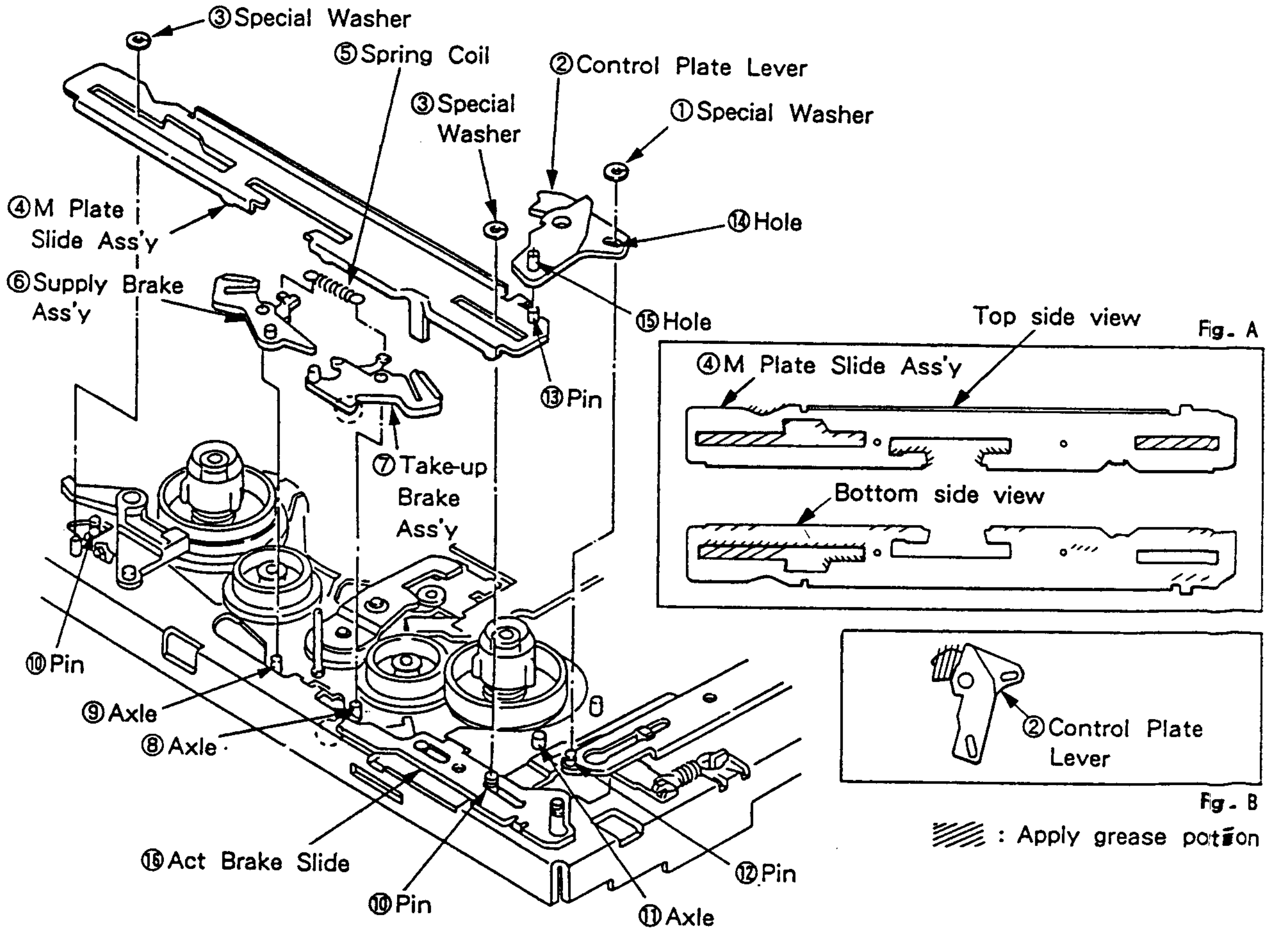
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SUB TAKE-UP BRAKE as instructed in 5-7-1.
3) Remove the special washer ①, then remove the CONTROL PLATE LEVER ②.
4) Remove the two special washers ③, then remove the M PLATE SLIDE ASS'Y ④.
5) Remove the SPRING COIL ⑤.
6) Remove the SUPPLY BRAKE ASS'Y ⑥ and the TAKE-UP BRAKE ASS'Y ⑦.

Note: Take care not to soil the brake shoes.

2. Remounting

1) Apply a thin layer of grease to axles ⑧ and ⑨.
2) Mount the TAKE-UP BRAKE ASS'Y ⑦ onto the axle ⑧.
3) Mount the SUPPLY BRAKE ASS'Y ⑥ onto the axle ⑨.
4) After applying a thin layer of grease to the M PLATE SLIDE ASS'Y ④ as shown in Fig. A, mount it onto the two pins ⑩.
5) Mount the two special washers ③ onto the two pins ⑩.
6) After applying grease to the CONTROL PLATE LEVER ② as shown in Fig. B, mount it onto the axle ⑪. Insert the ACT PLATE SLIDE ASS'Y pin ⑫ into the hole ⑭, and the M PLATE SLIDE ASS'Y pin ⑬ into the hole ⑮.
7) Mount the special washer ① onto the pin ⑫.
8) Mount the SUB TAKE-UP BRAKE as instructed in 5-7-1.
9) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.


③Special Washer
⑤Spring Coil
②Control Plate Lever
③Special Washer
①Special Washer
④M Plate Slide Ass'y
⑭Hole
⑥Supply Brake Ass'y
⑮Hole
⑬Pin
⑦Take-up Brake Ass'y
⑩Pin
⑨Axle
⑧Axle
⑯Act Brake Slide
⑩Pin
⑫Pin
⑪Axle
Top side view
Fig. A
④M Plate Slide Ass'y
Bottom side view
②Control Plate Lever
Fig. B
▨ : Apply grease portion

When assembling, the contact surfaces of Take-up Brake ⑦ and the Brake Slide ⑯ marked with ◌ should contact but not overlap each other.

Fig. 5-7-2. Supply Brake Ass'y & Take-up Brake Ass'y

5-7-3. Tension Lever Ass'y and Band Holder Ass'y (See Fig. 5-7-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) Remove the screw ③ fixing the BAND HOLDER ASS'Y ②.
4) Push the SUB SUPPLY BRAKE ④ in the direction of the arrow A, setting the BAND HOLDER ASS'Y ② free.
5) Open the hook ⑤ a little and remove the TENSION LEVER ASS'Y ⑥. Take care not to open the hook ⑤ too much, otherwise it may be deformed or broken.
6) Remove the hook ⑦ of the BAND HOLDER ASS'Y.

2. Remounting

1) Mount the BAND HOLDER ASS'Y hook ⑦ into the TENSION LEVER ASS'Y hole ⑧.
2) Insert the TENSION LEVER ASS'Y axle ⑨ into the hole ⑩ and confirm that the hook ⑤ is hooked.
3) While pushing the SUB SUPPLY BRAKE ④ in the direction of arrow A, mount the BAND HOLDER ASS'Y ② with the screw ③.
4) Hook the SPRING COIL ① between the hooks ⑪ and ⑫.
5) Perform TENSION POLE position adjustment as instructed in 6-3.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

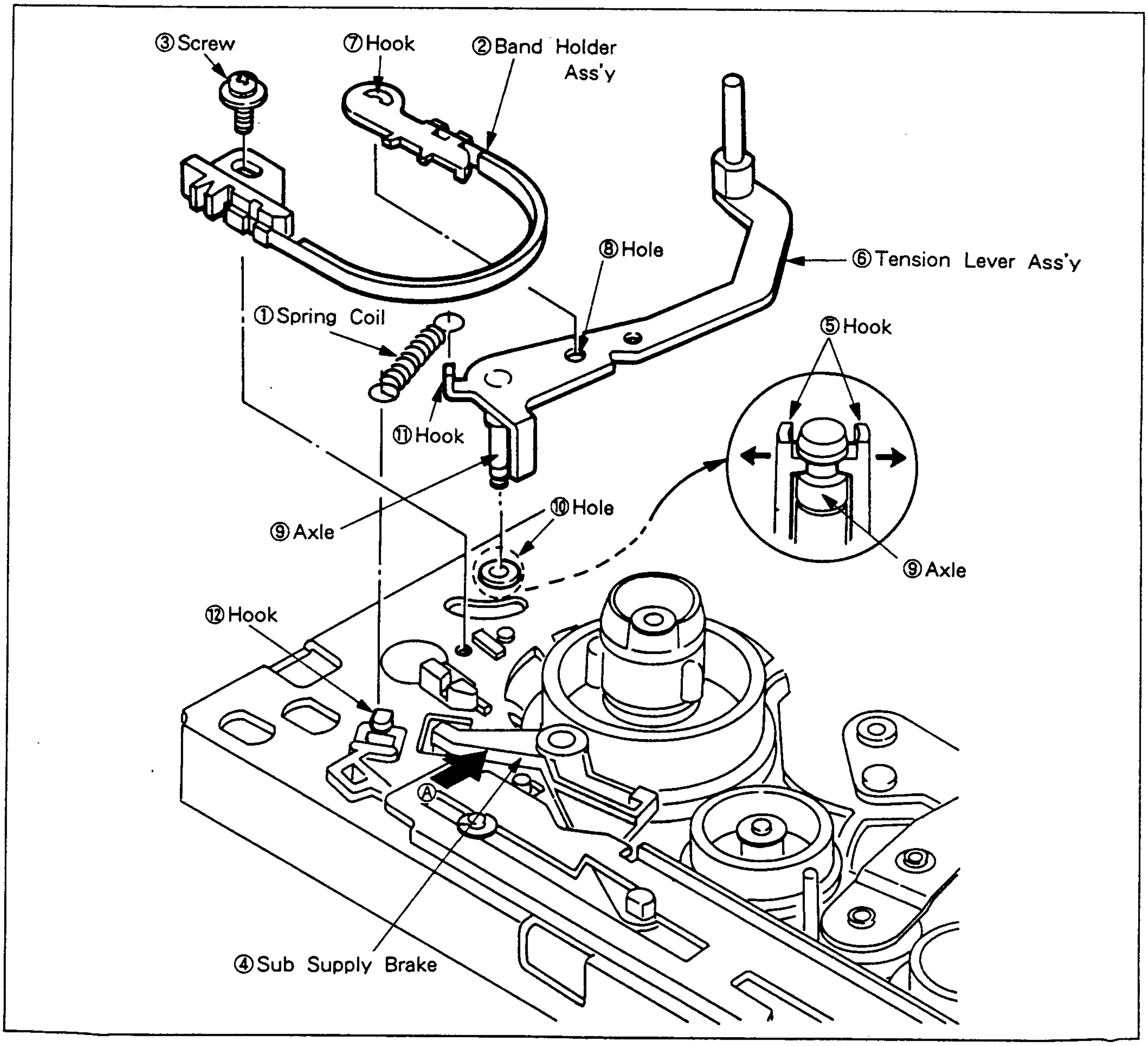

③Screw
⑦Hook
②Band Holder Ass'y
⑧Hole
⑥Tension Lever Ass'y
①Spring Coil
⑤Hook
⑪Hook
⑩Hole
⑨Axle
⑨Axle
⑫Hook
Ⓐ
④Sub Supply Brake

Fig. 5-7-3. Tension Lever Ass'y & Band Holder Ass'y

5-7-4. Capstan Brake Ass'y (See Fig. 5-7-4.)

1. Removal

1) Remove the SPRING COIL ①.
2) Unhook the hook ②, then remove the CAPSTAN BRAKE ASS'Y ③.

2. Remounting

1) Mount the CAPSTAN BRAKE ASS'Y ③ onto the axle ④. Confirm that the hook ② is hooked to the chassis.
2) Hook the SPRING COIL ① between hooks ⑤ and ⑥. Fix the hook ⑥ side with adhesive (use an adhesive that allows later detaching).

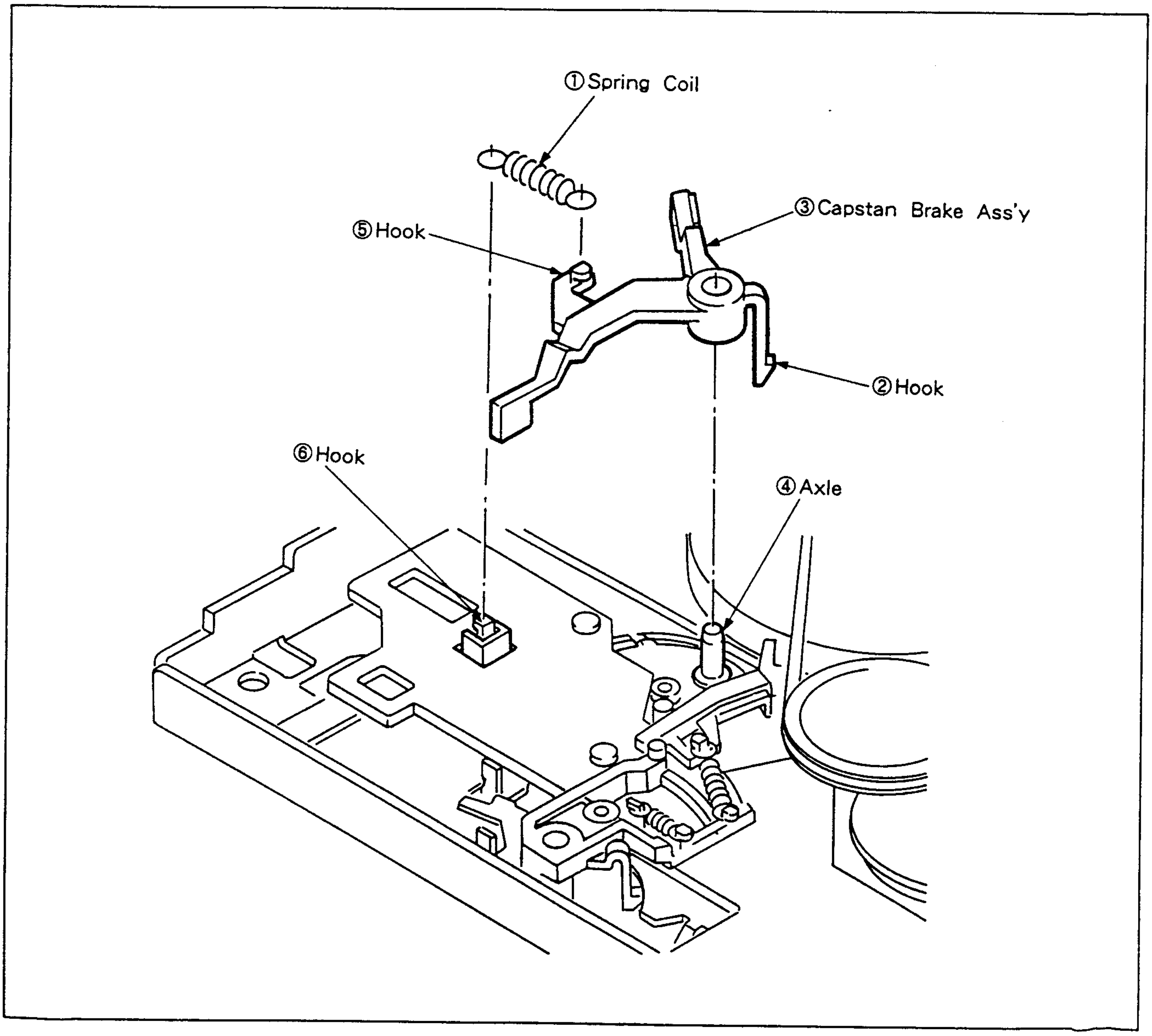

①Spring Coil
③Capstan Brake Ass'y
⑤Hook
②Hook
⑥Hook
④Axle

Fig. 5-7-4. Capstan Brake Ass'y

5-8. REEL TABLE DRIVE MECHANISM

5-8-1. Supply Reel Ass'y and Supply Reel Gear (See Fig. 5-8-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the BAND HOLDER ASS'Y as instructed in 5-7-3.
3) Set the PLAY mode with the mode selector (VHJ-0050).
4) Remove the special washer ①, then remove the SUPPLY REEL ASS'Y ② and the washer ③.
5) Remove the special washer ④.
6) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, remove the SUPPLY REEL GEAR ⑥ and the washer ⑦.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑧ indicated by the arrow B, then mount the washer ⑦.
2) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, mount the SUPPLY REEL GEAR ⑥ onto the axle ⑧.
3) Mount the special washer ④ to the axle ⑧.
4) Apply 1 drop of oil to the part of the axle ⑨ indicated by the arrow C, then mount the washer ③.
5) Mount the SUPPLY REEL ASS'Y ② onto the axle ⑨.
6) Perform reel table height adjustment as instructed in 6-2-1.
7) Mount the special washer ① onto the axle ⑨.
8) Mount the BAND HOLDER ASS'Y as instructed in 5-7-3.
9) Perform tension pole position adjustment as instructed in 6-3.
10) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

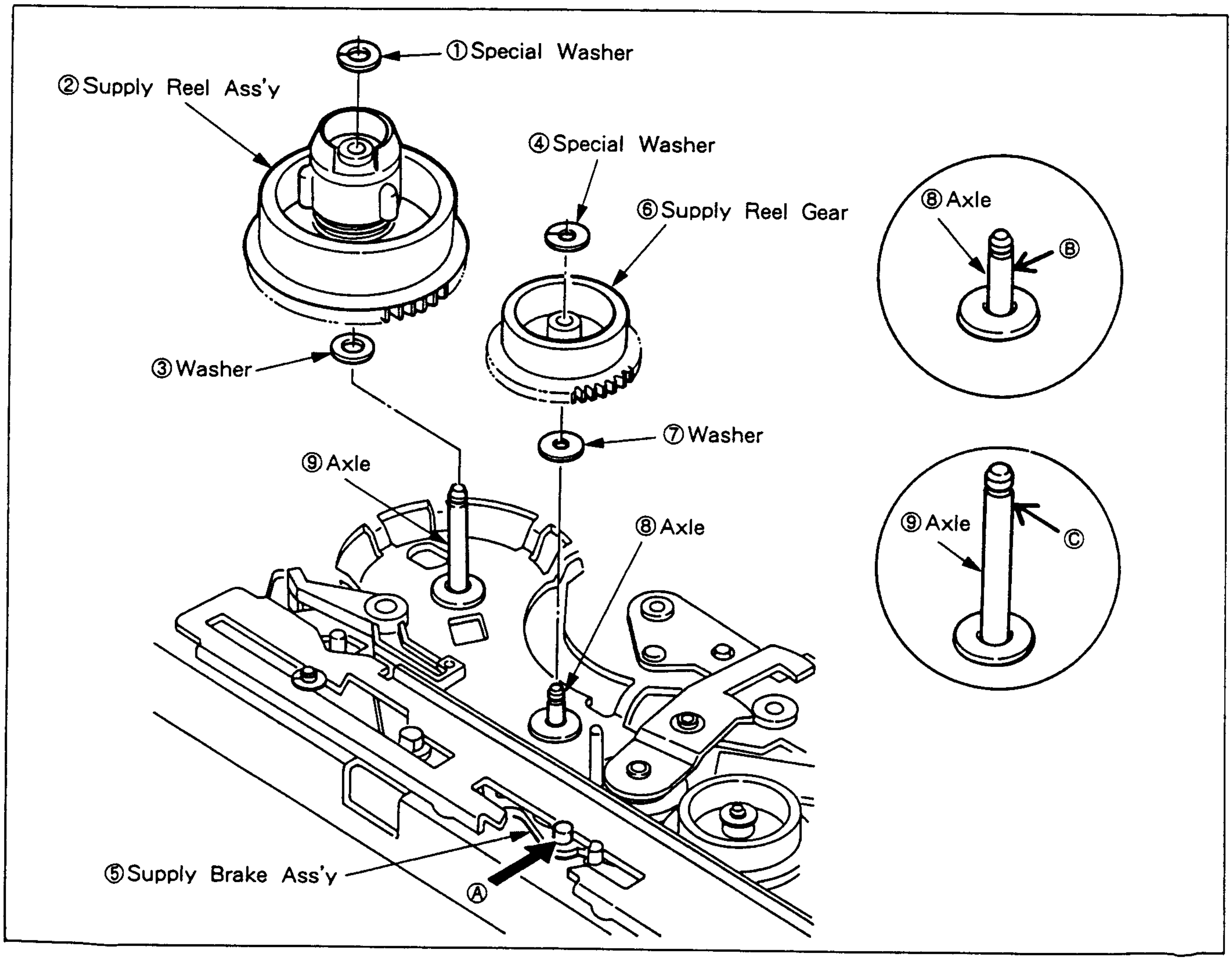


Fig. 5-8-1. Supply Reel Ass'y & Supply Reel Gear

5-8-2. Take-up Reel Ass'y (See Fig. 5-8-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the special washer ①.
3) Push the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A to release the brake, then remove the TAKE-UP REEL ASS'Y ③ and the washer ④.

Note: Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply 1 drop of oil to the part of the axle ⑤ indicated by the arrow B, then mount the washer ④.
2) While pushing the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A, mount the TAKE-UP REEL ASS'Y ③ onto the axle ⑤.
3) Perform reel table height adjustment as instructed in 6-2.
4) Mount the special washer ① onto the axle ⑤.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

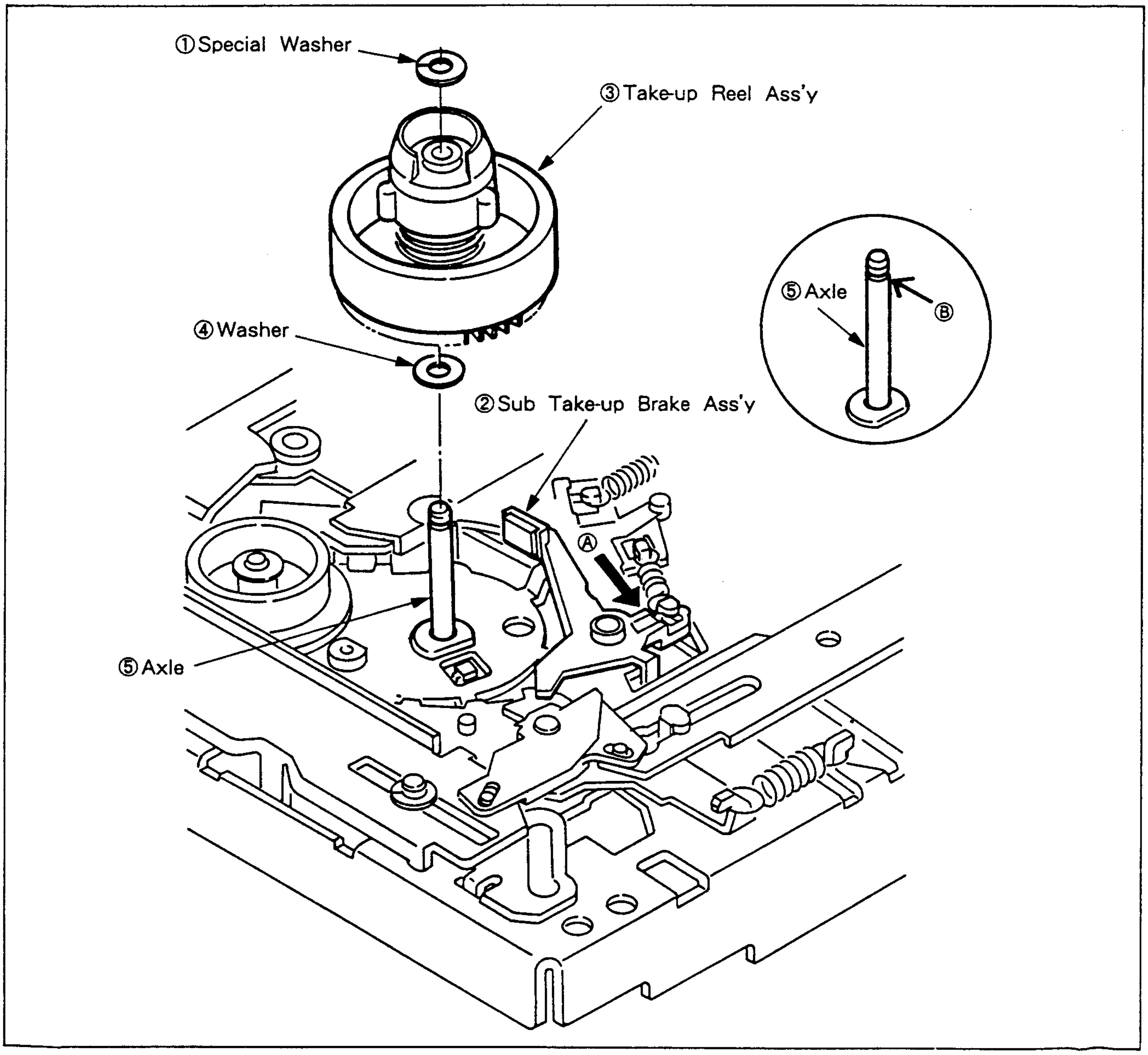


Fig. 5-8-2. Take-up Reel Ass'y

5-8-3. Take-up Reel Gear (See Fig. 5-8-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
3) Remove the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
4) Remove the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Remove the special washer ①, then remove the TAKE-UP REEL GEAR ③ and the washer ④.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑤ indicated with an arrow.
2) Mount the washer ④ and the TAKE-UP REEL GEAR ③ onto the axle ⑤.
3) Mount the special washer ① onto the axle ⑤.
4) Mount the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Mount the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
6) Mount the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
7) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

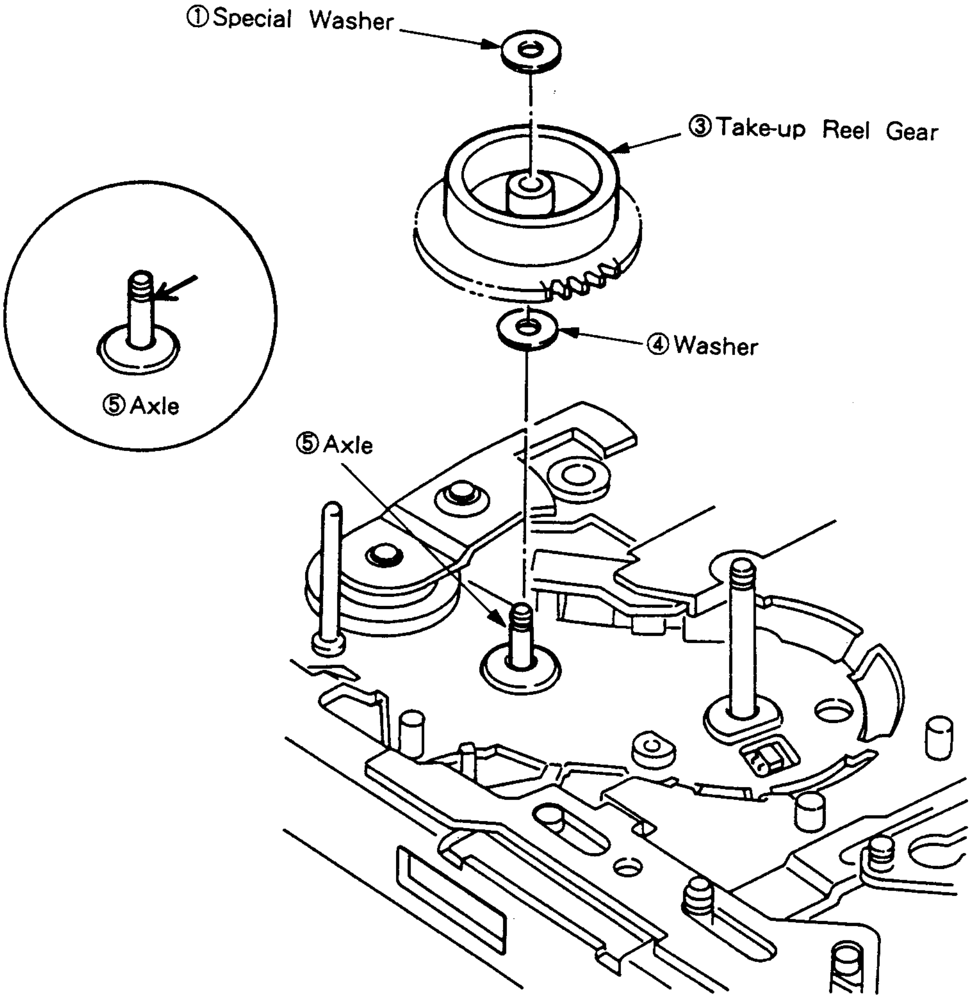


Fig. 5-8-3. TaKe-up Reel Gear

5-8-4. Reel Pulley and Friction Gear Ass'y (See Fig. 5-8-4.)

1. Removal

1) Remove the two screws ①, then remove the PULLEY BRACKET ②.
2) Remove the REEL DRIVE BELT ③.
3) Remove the special washer ④, then remove the REEL PULLEY ⑤.
4) Remove the special washer ⑥, then remove the FRICTION GEAR ASS'Y ⑦ and the washer ⑧.

2. Remounting

1) Apply one drop of oil to the parts of axles ⑨ and ⑩ indicated with an arrow.
2) Mount the washer ⑧ and the FRICTION GEAR ASS'Y ⑦ onto the axle ⑨.
3) Mount the special washer ⑥ onto the axle ⑨.
4) Mount the REEL PULLEY ⑤ onto the axle ⑩.
5) Mount the special washer ④ onto the axle ⑩.
6) Set the REEL DRIVE BELT ③.
7) Mount the PULLEY BRACKET ② with the two screws ①.

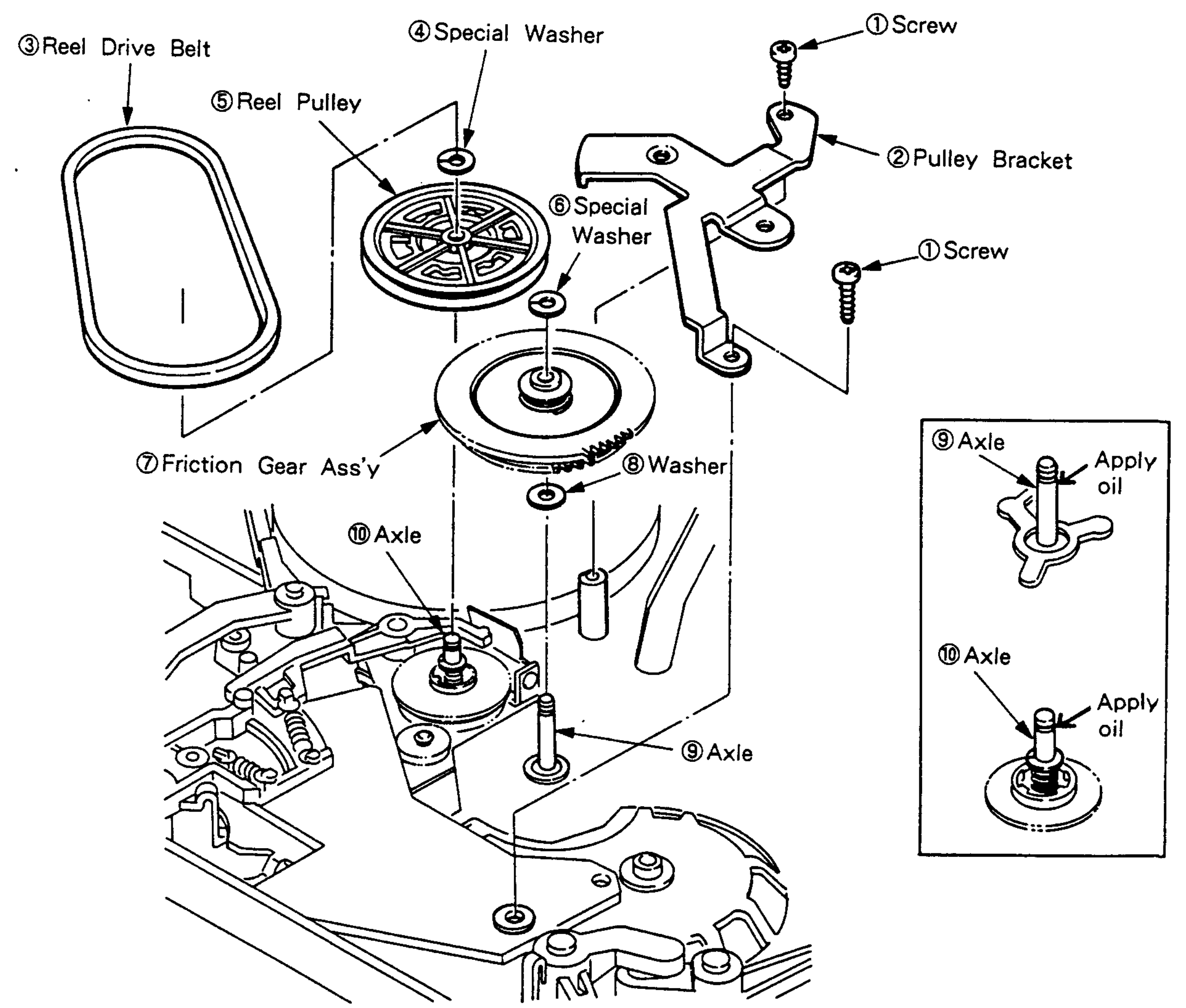

③Reel Drive Belt
④Special Washer
①Screw
⑤Reel Pulley
②Pulley Bracket
⑥Special Washer
①Screw
⑦Friction Gear Ass'y
⑧Washer
⑩Axle
⑨Axle
⑨Axle
Apply oil
⑩Axle
Apply oil

Fig. 5-8-4. Reel Pulley & Friction Gear

5-8-5. COMPL Clutch (See Fig. 5-8-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the screw ①, then remove the COMPL MC-4 ②.
4) Remove the two screws ③, then remove the COMPL CLUTCH ④.

2. Remounting

1) Mount the COMPL CLUTCH ④ with the two screws ③, aligning it with the protuberance ⑤.
2) After inserting the CN831 (COMPL MC-4) into the CN801 (COMPL MC-1), mount the COMPL MC-4 with the screw ①.
3) Mount the REEL PULLEY, the REEL DRIVE BELT and the PULLEY BRACKET as instructed in 5-8-4.
4) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

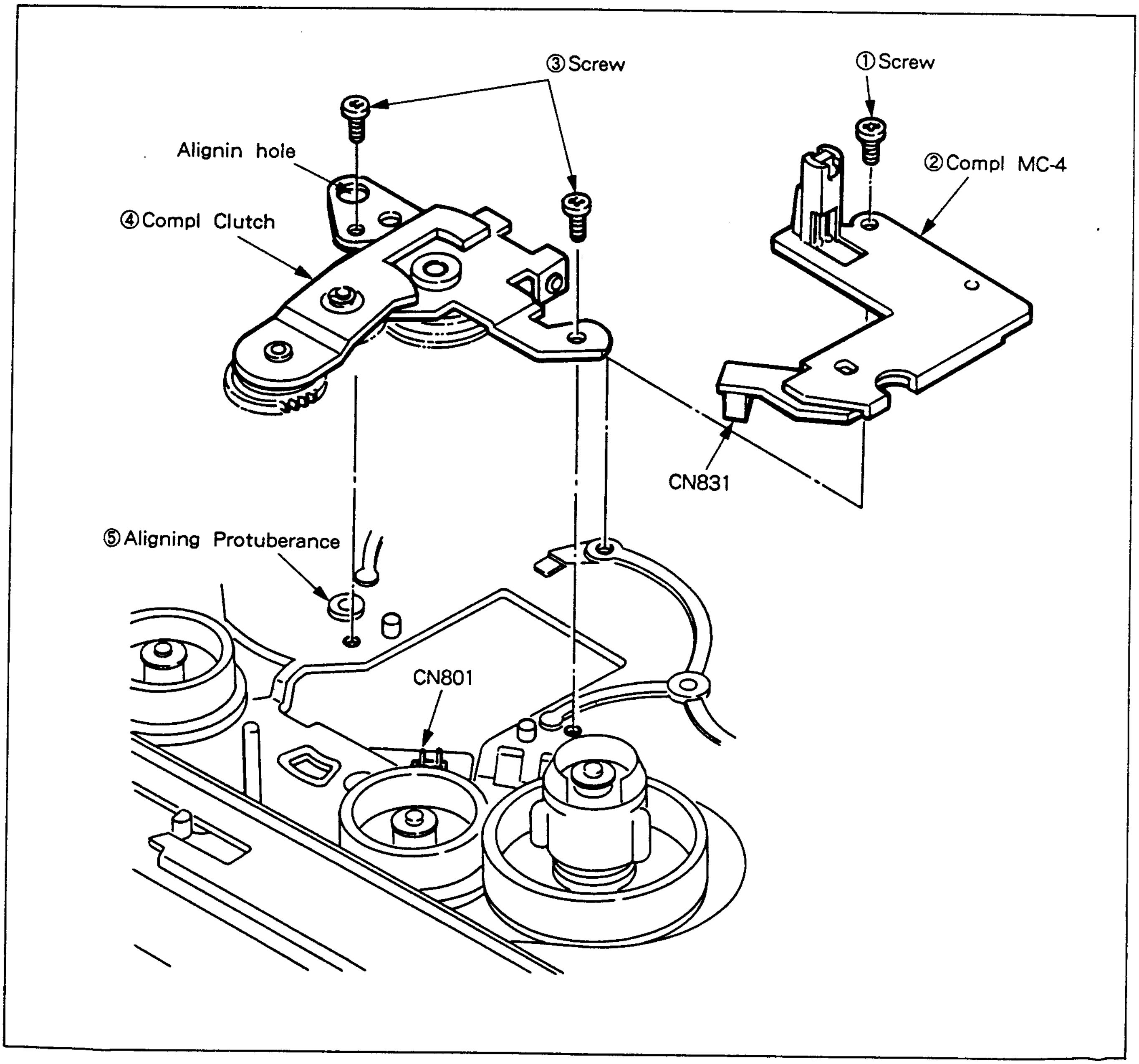

③Screw
①Screw
Alignin hole
②Compl MC-4
④Compl Clutch
CN831
⑤Aligning Protuberance
CN801

Fig. 5-8-5. Compl Clutch

5-8-6. Clutch Change Lever and Clutch Lever Ass'y (See Fig. 5-8-6.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the SPRING COIL ①.
4) Unhook the hook ②, then remove the CLUTCH CHANGE LEVER ③.
5) Unhook the hook ⑤, then remove the CLUTCH LEVER ASS'Y ⑥.

2. Remounting

1) Mount the CLUTCH LEVER ASS'Y ⑥ onto the axle ⑦. Confirm that the hook ⑤ is hooked to the chassis.
2) Mount the CLUTCH CHANGE LEVER ③ onto the axle ⑧. Confirm that the hook ② is hooked to the chassis.
3) Hook the SPRING COIL ① between the hooks ⑨ and ⑩.
4) Mount the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

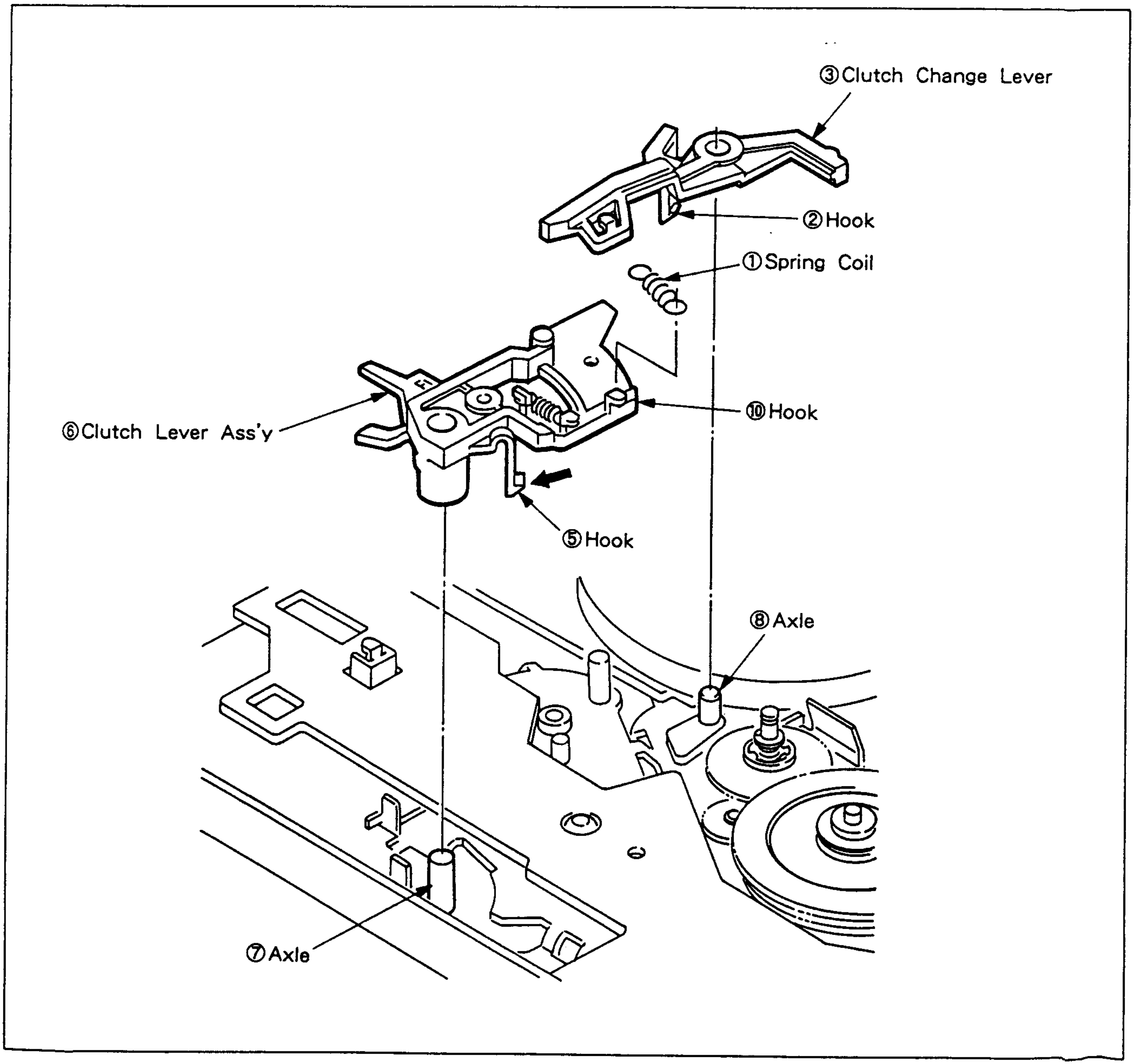


Fig. 5-8-6. Clutch Change Lever & Clutch Lever Ass'y

5-9. CAPSTAN MOTOR (See Fig. 5-9-1.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the CAPSTAN MOTOR ⑥ connector.
3) Remove the REEL DRIVE BELT ② from the CAPSTAN MOTOR PULLEY ①.
4) Remove the two screws ④ fixing the COMPL CASSETTE MECHANISM TOP BOARD ③, then slide the TOP BOARD ③ backward.
5) Remove the three screws ⑤, then remove the CAPSTAN MOTOR ⑥.

Note : Take care not to scratch or soil the capstan axle.

2. Remounting

1) Mount the CAPSTAN MOTOR ⑥ with the three screws ⑤.
2) Connect the CAPSTAN MOTOR ⑥ connector.
3) Mount the TOP BOARD ③ with the two screws ④.
4) Fit the REEL DRIVE BELT ② around the CAPSTAN MOTOR PULLEY ① and the REEL PULLEY ⑦.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

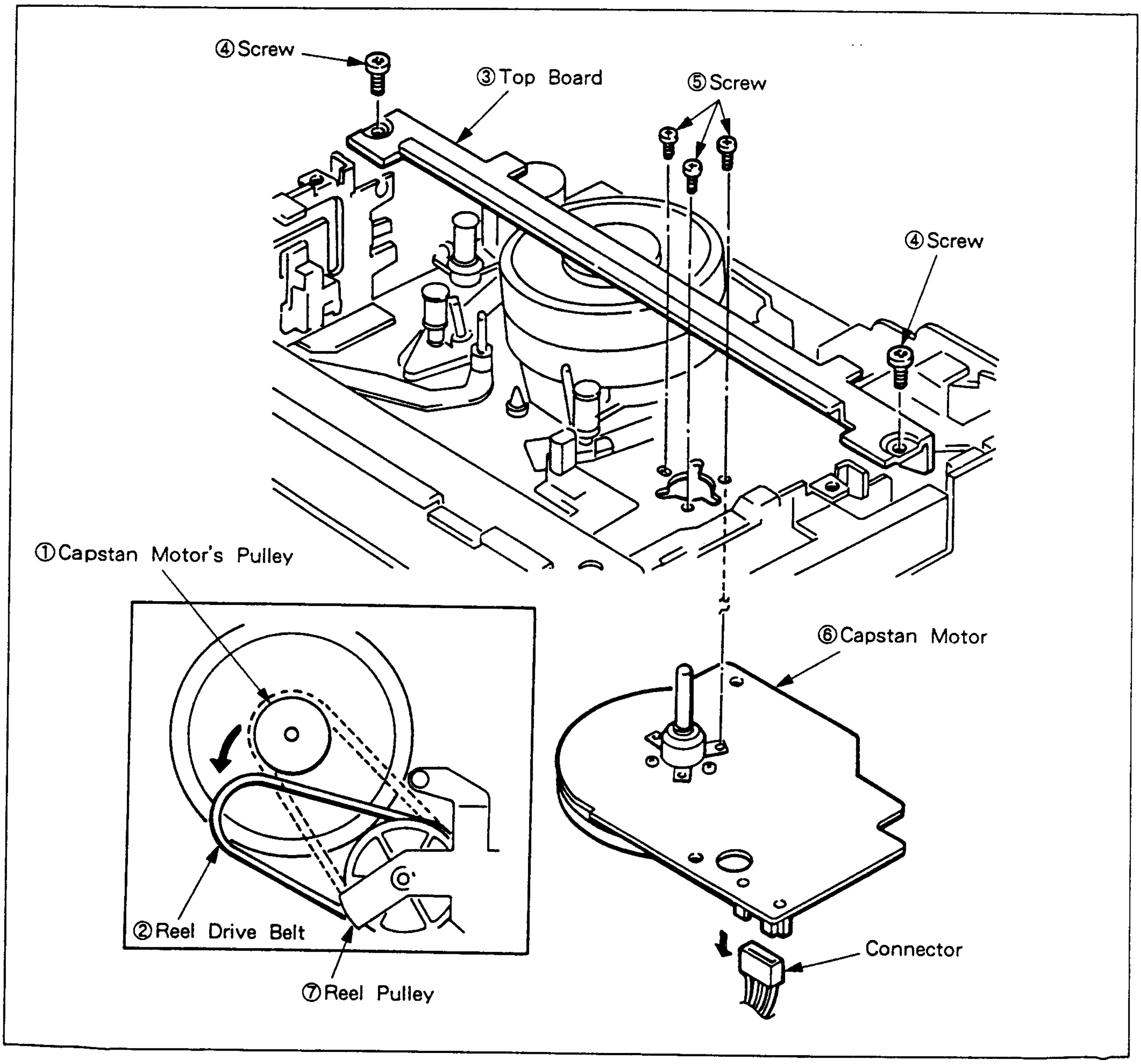

④Screw
③Top Board
⑤Screw
④Screw
①Capstan Motor's Pulley
⑥Capstan Motor
②Reel Drive Belt
⑦Reel Pulley
Connector

Fig. 5-9-1. Capstan Motor

5-10. FIXED GUIDE, FE HEAD LEVER ASS'Y

5-10-1. Entrance side Fixed Guide and FE Lever Ass'y (See Fig. 5-10-1.)

1. Removal

1) Remove the SP NUT ①, then remove the GUIDE PIPE ③ and the SP washer ② (lower), in that order.
2) Remove the SPRING COIL ⑤.
3) Remove the FTE HEAD connector.
4) Remove the special washer ⑥, then remove the FE HEAD LEVER ASS'Y ⑦.

Note : A SP washer ⑪ (upper) and a SPRING COIL ④ are sometimes inserted between the SP NUT ①and the special washer ⑥. In this case, put it back in its original position when remouting the entrance side fixed guide.

2. Remounting

1) After mounting the FE LEVER ASS'Y ⑦ onto the axle ⑧, mount the special washer ⑥.
2) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE LEVER ASS'Y hook ⑩.
3) Mount the SP washer ② (lower), the GUIDE pipe ③ and the SP NUT ① to the axle ⑧, in that order.
4) Connect the connector to the FTE HEAD.
5) Perform hight adjustment of the entrance side fixed guide (S) as instructed in 6-4 when remounted the SPRING COIL ④ and the SP washer ⑪ (upper).

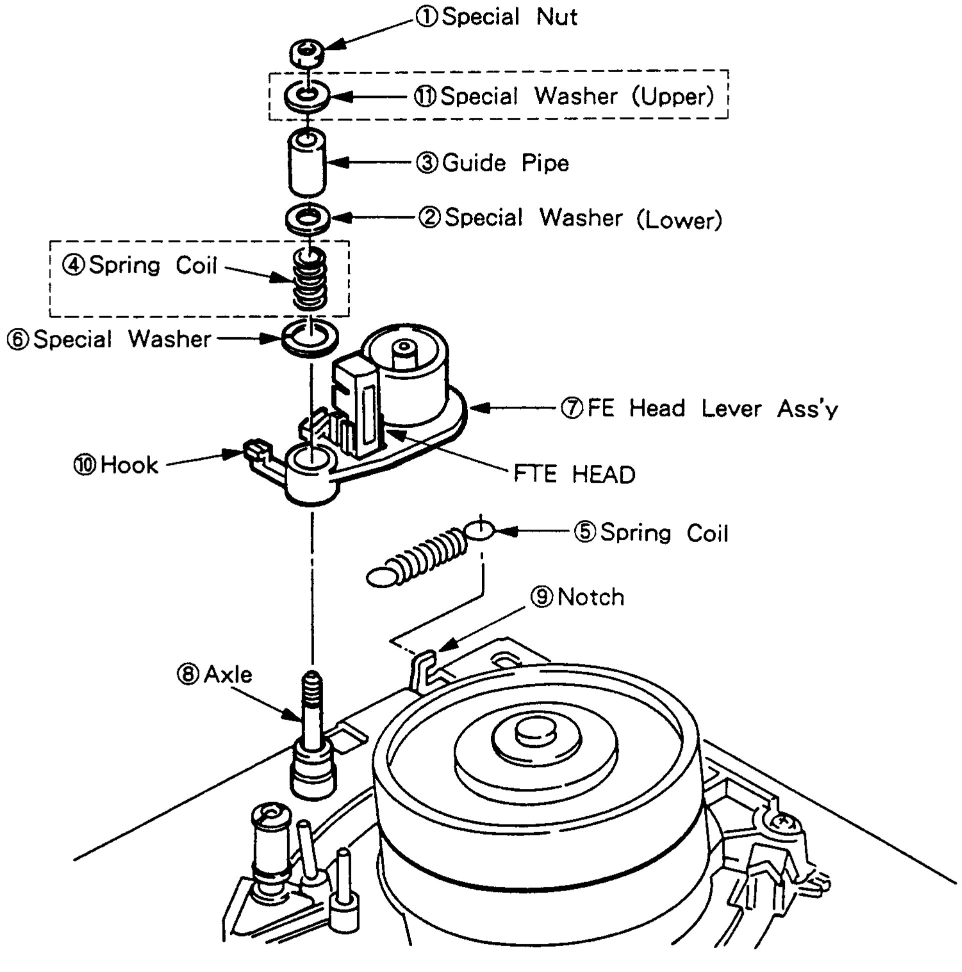

①Special Nut
⑪Special Washer (Upper)
③Guide Pipe
②Special Washer (Lower)
④Spring Coil
⑥Special Washer
⑦FE Head Lever Ass'y
⑩Hook
FTE HEAD
⑤Spring Coil
⑨Notch
⑧Axle

Fig. 5-10-1. Fixed Guide (S) & FE Lever Ass'y

5-10-2. Impedance Roller, FTE Head (See Fig. 5-10-2.)

1. Removal

1) Remove the FTE HEAD (full track erase head) ① connector.
2) Remove the special washer ②, then remove the IMPEDANCE ROLLER ③ and the washer ④.
3) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note : Take care not to open the hook too much, otherwise it may be deformed or broken.

2. Remounting

1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
2) Mount the washer ④ and the IMPEDANCE ROLLER ③, in that order, onto the axle ⑦, then mount the special washer ②.
3) Connect the connector to the terminal of the FTE HEAD ①.

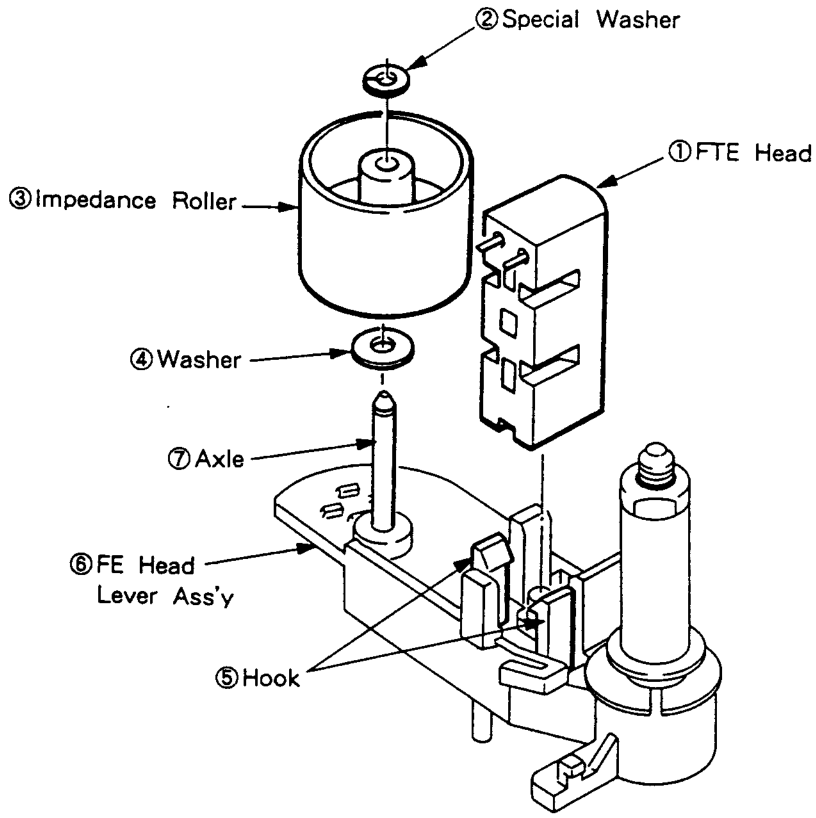

②Special Washer
①FTE Head
③Impedance Roller
④Washer
⑦Axle
⑥FE Head Lever Ass'y
⑤Hook

Fig. 5-10-2. Impedance Roller & FTE Head

5-10-3. Exit side Fixed Guide (See Fig. 5-10-3.)

1. Removal

1) Remove the CAP ①.
2) Remove the SP NUT ②, then remove the SP washer ③ (upper), the GUIDE PIPE ④, the SP washer ③ (lower) and the SPRING COIL ⑤, in that order.

2. Remounting

1) Mount the SPRING COIL ⑤, the SP washer ③ (lower), the GUIDE PIPE ④, the SP washer ③ (upper) and the SP NUT ②, in that order, to the axle ⑥.
2) Mount the CAP ① onto the axle ⑥.
3) Perform height adjustment of the fixed guide (T) as instructed in 6-4.

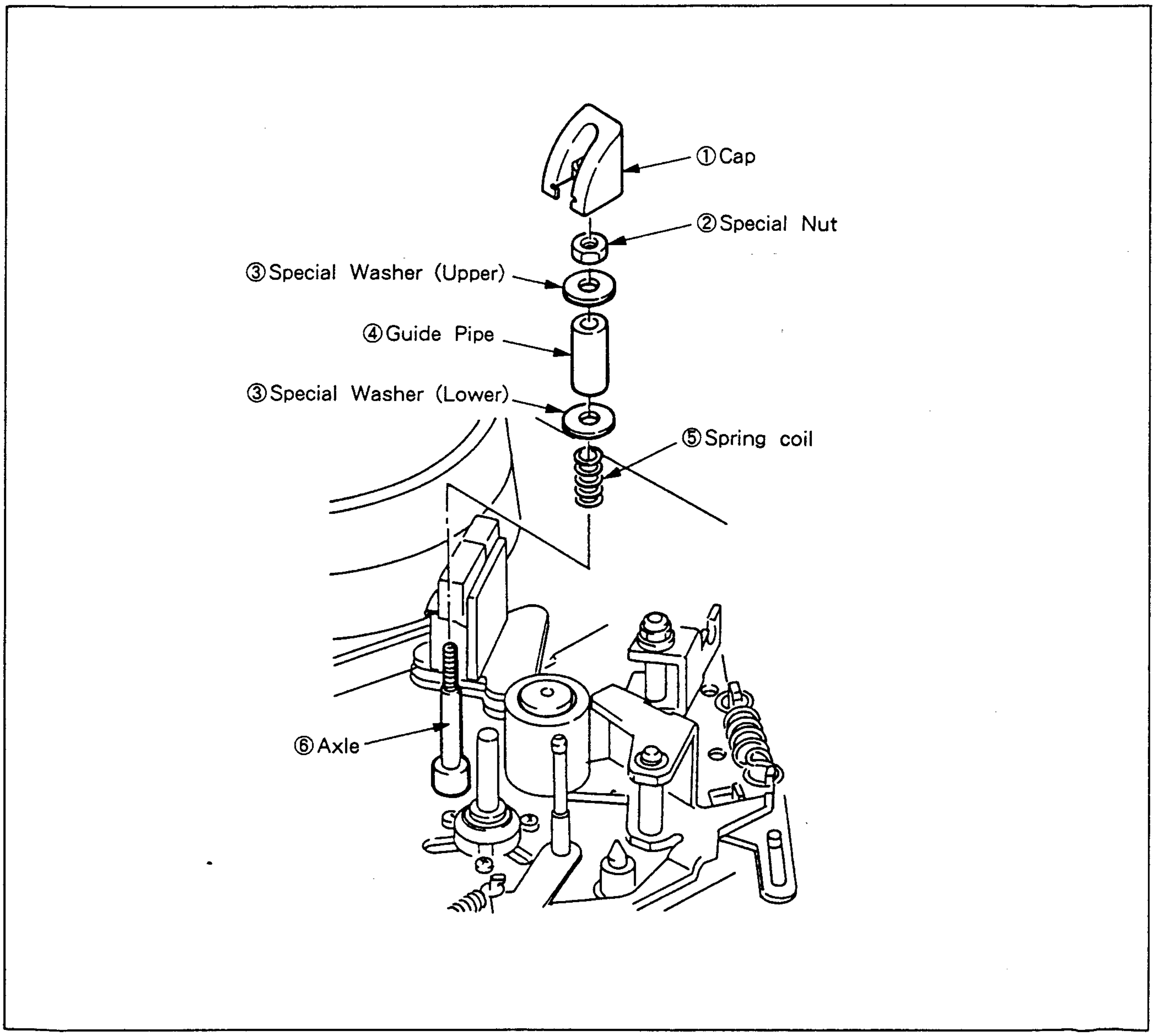

①Cap
②Special Nut
③Special Washer (Upper)
④Guide Pipe
③Special Washer (Lower)
⑤Spring coil
⑥Axle

Fig. 5-10-3. Fixed Guide (T)

5-11. DRUM SECTION

5-11-1. Drum Motor (rotor, stator) (See Fig. 5-11-1.)

1. Removal

1) Remove the screw ①, then remove the CYLINDER EARTH ASS'Y ②.
2) Remove the two screws ③, then remove the ROTOR ④ and SPACER.
3) Remove the STATOR board connector ⑩.
4) Remove the three screws ⑤, then remove the STATOR ⑥.

2. Remounting

1) Mount the STATOR ⑥ with the three screws ⑤.
2) Mount the SPACER ⑪ on to the AXLE ⑫.
3) While aligning the ROTOR oval hole ⑦ with the ROTOR DISK hole ⑧, mount the ROTOR with the two screws ③.
4) Insert the connector ⑩.
5) While aligning the CYLINDER EARTH ASS'Y ② protuberance with the chassis hole ⑨, mount it with the screw ①.

Note 1 : Use a torque driver (VHJ-0014) for mounting the STATOR ⑥ and the ROTOR ④. Set fastening torque to 3kg-cm.

Note 2 : When the drum unit has been replaced, perform a tape path adjustment as instructed in 6-4. and perform a CH-1/CH-2 switching position adjustment of the servo circuit.

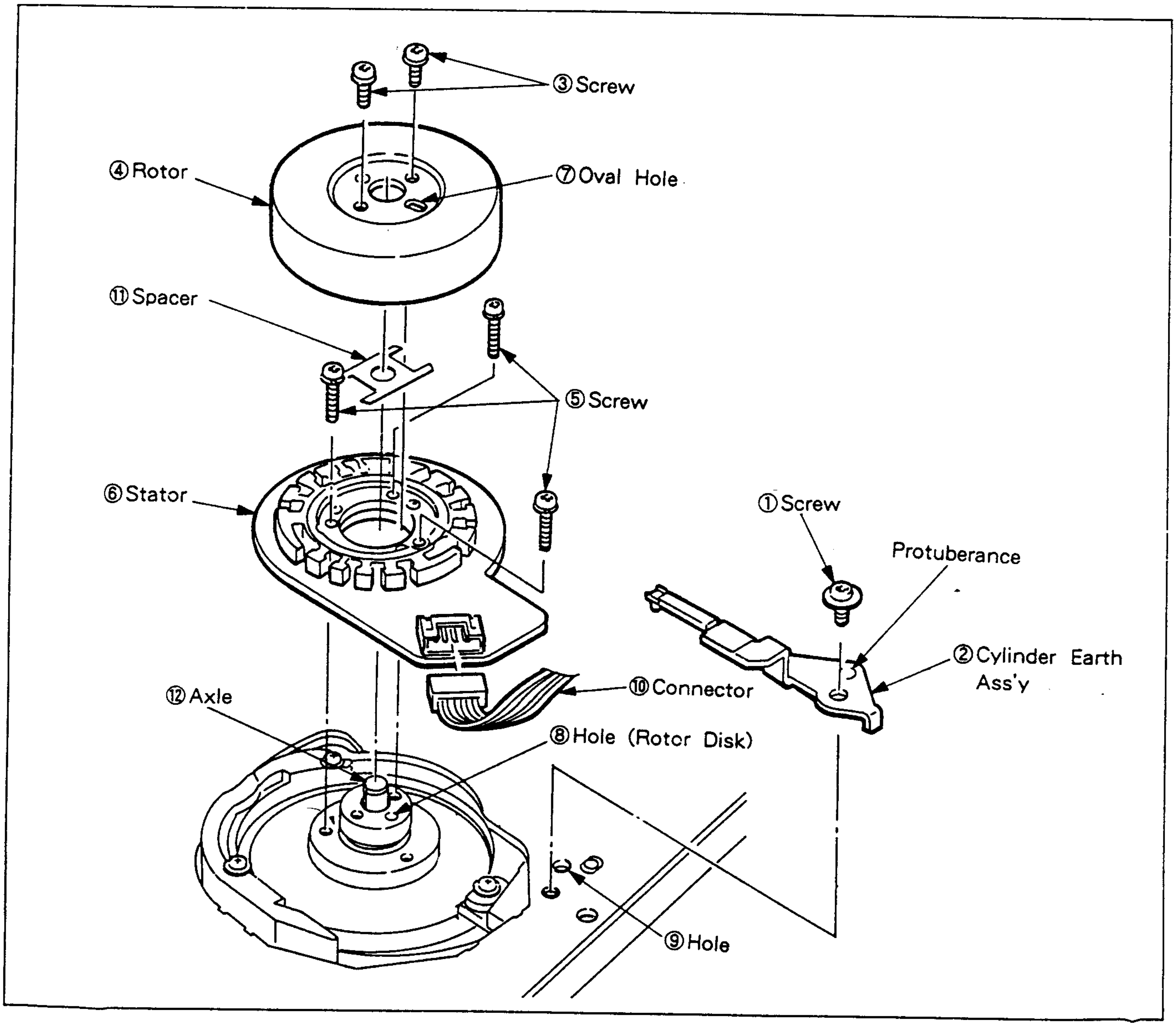

③Screw
④Rotor
⑦Oval Hole
⑪Spacer
⑤Screw
⑥Stator
①Screw
Protuberance
⑫Axle
⑩Connector
②Cylinder Earth Ass'y
⑧Hole (Rotor Disk)
⑨Hole

Fig. 5-11-1. Drum Motor

5-11-2. Drum Unit (See Fig. 5-11-2.)

1. Removal

1) For some models with the board located above the upper drum, remove the board.
2) Remove the flexible P.C.B. ① from the PRE-AMP UNIT (take care not to pull the flexible P.C.B. in the upward direction).
3) Remove the LOAD RACK only, as instructed in 5-4-1.
4) Remove the three screws ②, then remove the drum unit ③.

   NOTE : When removing and remounting the drum unit, handle it carefully to protect it from scratches and dirt.

2. Remounting

1) While aligning the drum unit ③ to the protuberance, mount it to the drum base (CYLINDER BASE) ⑤ with the three screws ②.
2) Mount the ROAD RACK as instructed in 5-4-1.
3) Insert the flexible P.C.B. into the PRE-AMP UNIT.
4) Clean the drum unit.
5) Perform the tape path adjustment as instructed in 6-4. and perform the CH-1/CH-2 switching position adjustment of the servo circuit.

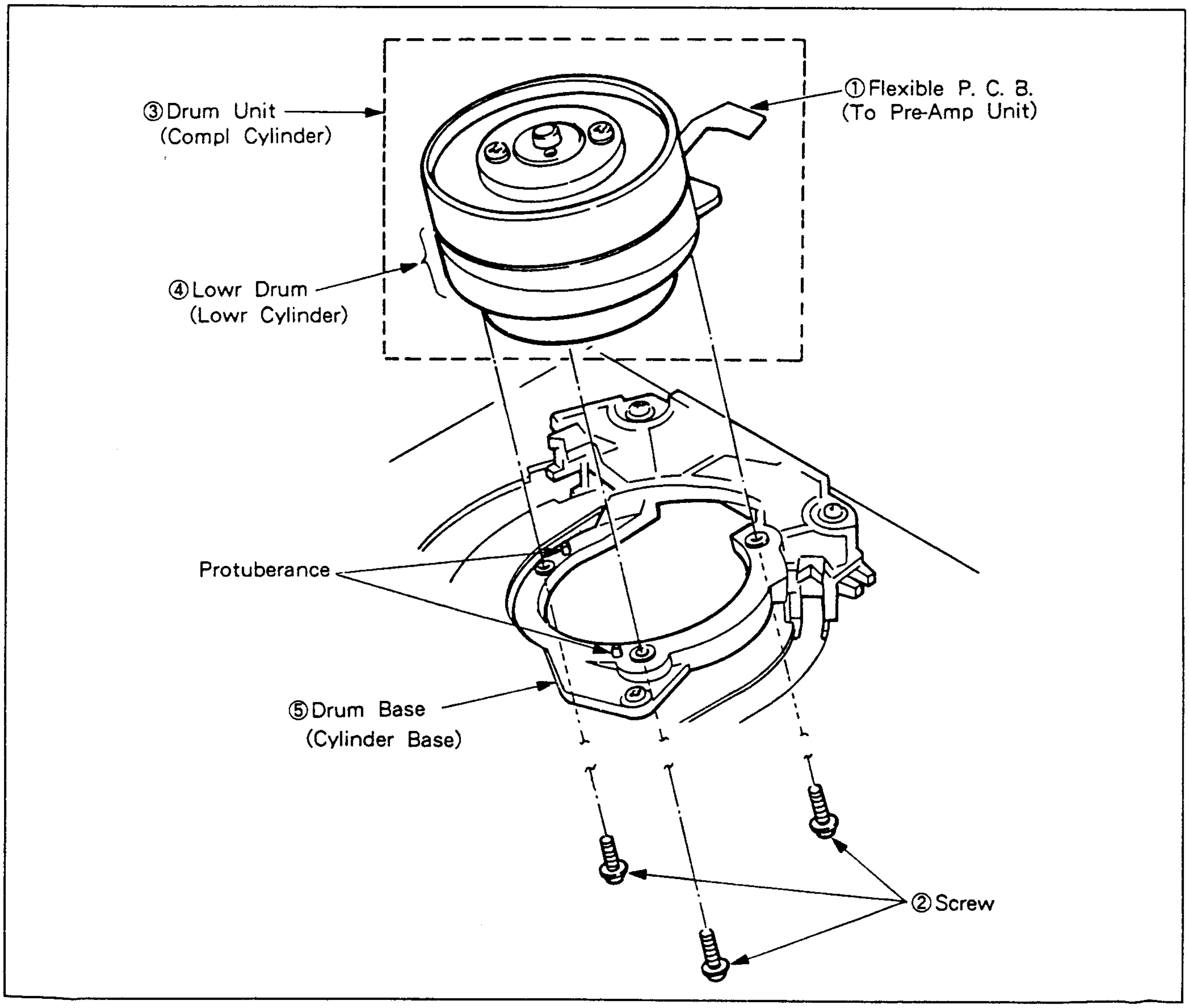

③Drum Unit
(Compl Cylinder)
①Flexible P. C. B.
(To Pre-Amp Unit)
④Lowr Drum
(Lowr Cylinder)
Protuberance
⑤Drum Base
(Cylinder Base)
②Screw

Fig. 5-11-2 Drum Unit (Compl Cylinder)

5-11-3. Upper Drum (Upper Cylinder)

1. Removal

1) Remove the two screws ① (see Fig. 5-11-3).
2) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum (UPPER CYLINDER), remove the lead wires soldered from the P.C. board (see Fig. 5-11-4.).
3) Turn the head removing jig (VHJ-0041) handle ② counterclockwise to lift up the stopper ③ (see Fig. 5-11-5.).
4) Insert the two long screws ④ of the jig into the screw holes ⑥ located on the head chip side of the upper drum (UPPER CYLINDER) ⑤, then mount by turning the handle clockwise.
5) While holding the jig so that the upper drum ⑤ does not rotate, turn the handle ② clockwise to remove the upper drum.
6) Remove the jig from the upper drum.

Note : Handle parts carefully to protect the drum from scratches and dirt, and the video head from damage.

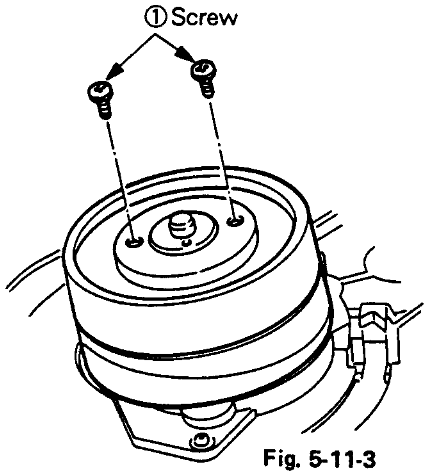


Fig. 5-11-3

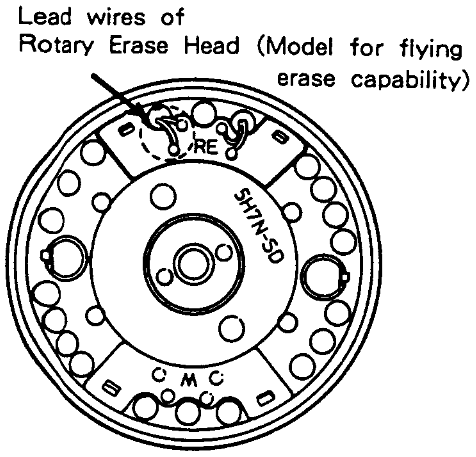

Lead wires of
Rotary Erase Head (Model for flying erase capability)
RE
5H7N-SO
C M C

Fig. 5-11-4

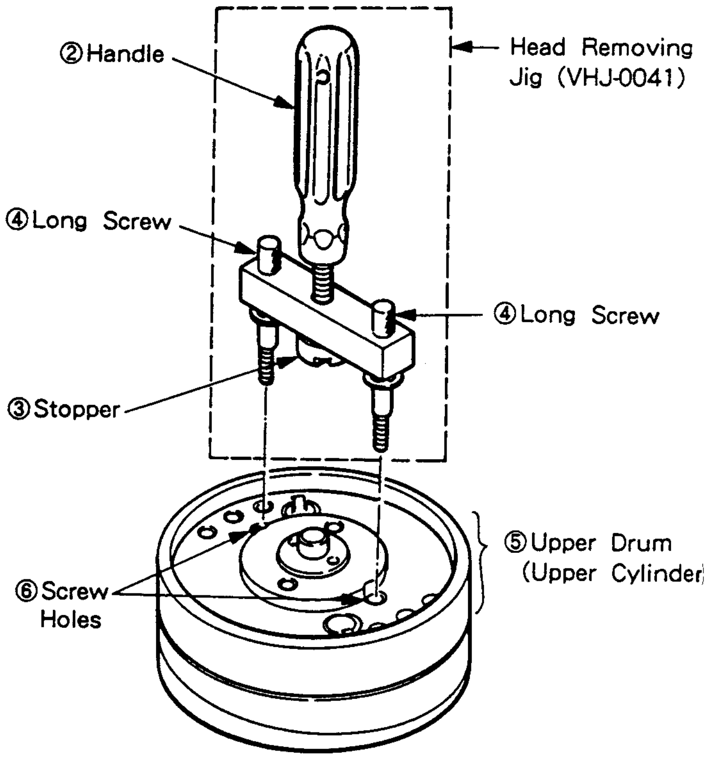

②Handle
Head Removing Jig (VHJ-0041)
④Long Screw
④Long Screw
③Stopper
⑤Upper Drum (Upper Cylinder)
⑥Screw Holes

Fig. 5-11-5

Upper Drum (Upper Cylinder)

2. **Remounting (See Fig. 5-11-6.)**

1) Confirm that surfaces where the flywheel and the upper drum (UPPER CYLINDER) are engaged or make contact portion are free from scratches and dirt.
2) The code name ① of the drum is printed on the video head side of the upper drum ⑤ SP CH-1 (channel A, plus azimuth). The code name ① is set with in the rotary transformer terminal round hole side ② position of lower drum (LOWER CYLINDER), so that the two screw holes ③ of the upper drum are aligned with the two screw holes ④ of the flywheel. (Refer to 3. Recognizing the SP CH-1 Head side).
3) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum, pass the lead wires through the lead wire hole. (See Fig.5-11-4.)
4) While keeping the upper drum ⑤ parallel to the lower drum (LOWER CYLINDER) ⑧, insert it completely into the flywheel.
5) Temporarily tighten the two screws ⑦ alternately a little at a time, then tighten them to a torque of 6kg-cm using a torque driver (VHJ-0014) and a 3mm bit (VHJ-0045).
6) In case the RE head is attached to the upper drum ⑤, solder the lead wires to the P.C. board. Solder the red lead wire to the R terminal, and the yellow lead wire to the Y terminal.

Note : When the upper drum has been replaced, perform a tape path adjustment as instructed in 6-4. and CH-1/CH-2 switching position adjustment of the servo circuit.

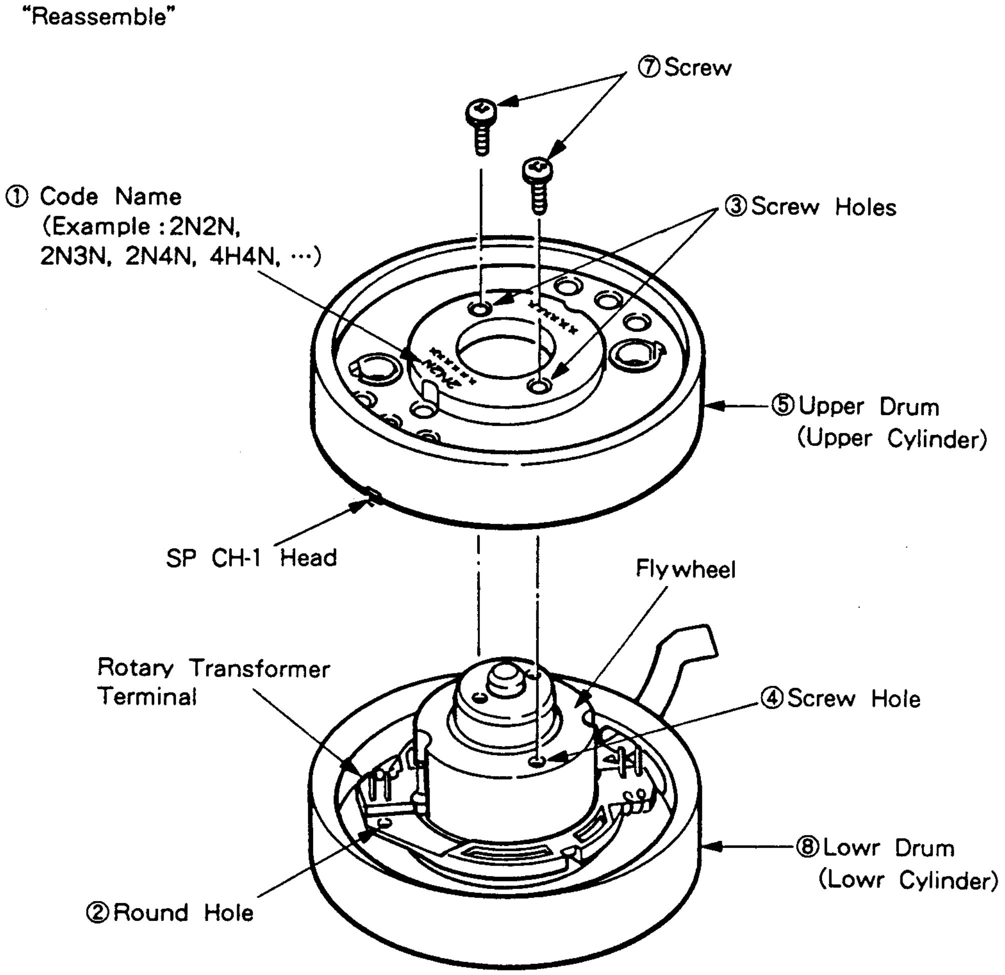

"Reassemble"
⑦Screw
① Code Name
(Example : 2N2N, 2N3N, 2N4N, 4H4N, ···)
③Screw Holes
⑤Upper Drum
(Upper Cylinder)
SP CH-1 Head
Flywheel
Rotary Transformer Terminal
④Screw Hole
⑧Lowr Drum
(Lowr Cylinder)
②Round Hole

Fig. 5-11-6.

3. **Recognizing the SP CH-1 Head Side**
No playback picture can be obtained if the video head is not wired as a pair with the rotary transformer located inside the lower drum rotating section. Therefore, mounting position should be matched when mounting the upper drum. In the P90 mechanism series, the code name of the drum is printed on the SP CH-1 (CH-A, plus azimuth) side as a mark for mounting the upper drum. (See Fig. 5-11-7.) This code name differs according to the drum type, but its basic form is as follows :

Code Name Form

④Ⓗ④Ⓟ-ⒹⓈ

A B C D E F

A = Number of head bases
B = "N" for normal audio
"H" for HI-FI audio
C = Number of heads
D = TV system ("N" or "P")
EF = Code for detailed classification. Depending on drum type, it can also be just one character, or a blank space.

Examples of Detailed Classification Codes
V = Head with level difference
D = Compatible with digital units
S = SVHS-compatible

Examples of Code Names
2N2P, 2N2P-L, 2N2P-V, 2N2P-D, 2N3P, 2N4P, 4H4P, 4H4P-D

Moreover, there is a round hole with marking purposes on the SP CH-1 (CH-A, plus azimuth) side of the lower drum rotary transformer terminal. As shown in Fig. 5-11-8, there are two types of rotary transformer terminals (the number of pins differs according to the number of heads).

Note : When ordering parts such as drums (CYLINDERS), do not use the code names ; always refer to the parts list and order with the specified part numbers.

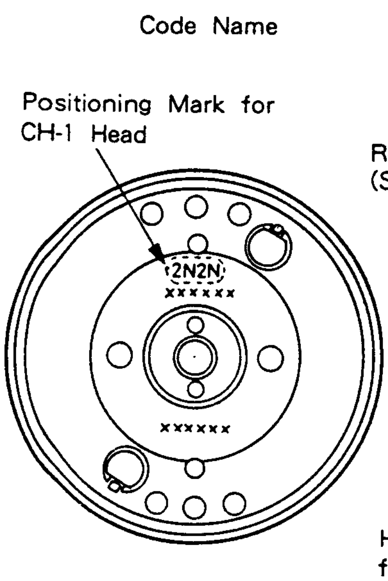

Code Name
Positioning Mark for CH-1 Head
2N2N
xxxxxx
xxxxxx

Fig. 5-11-7. Upper Drum

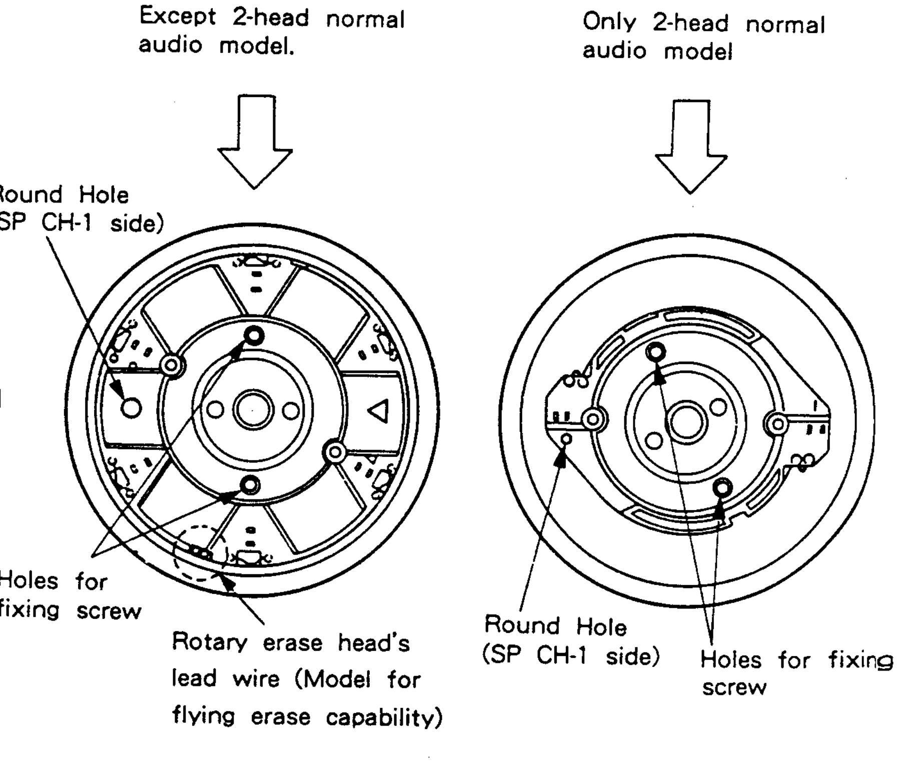
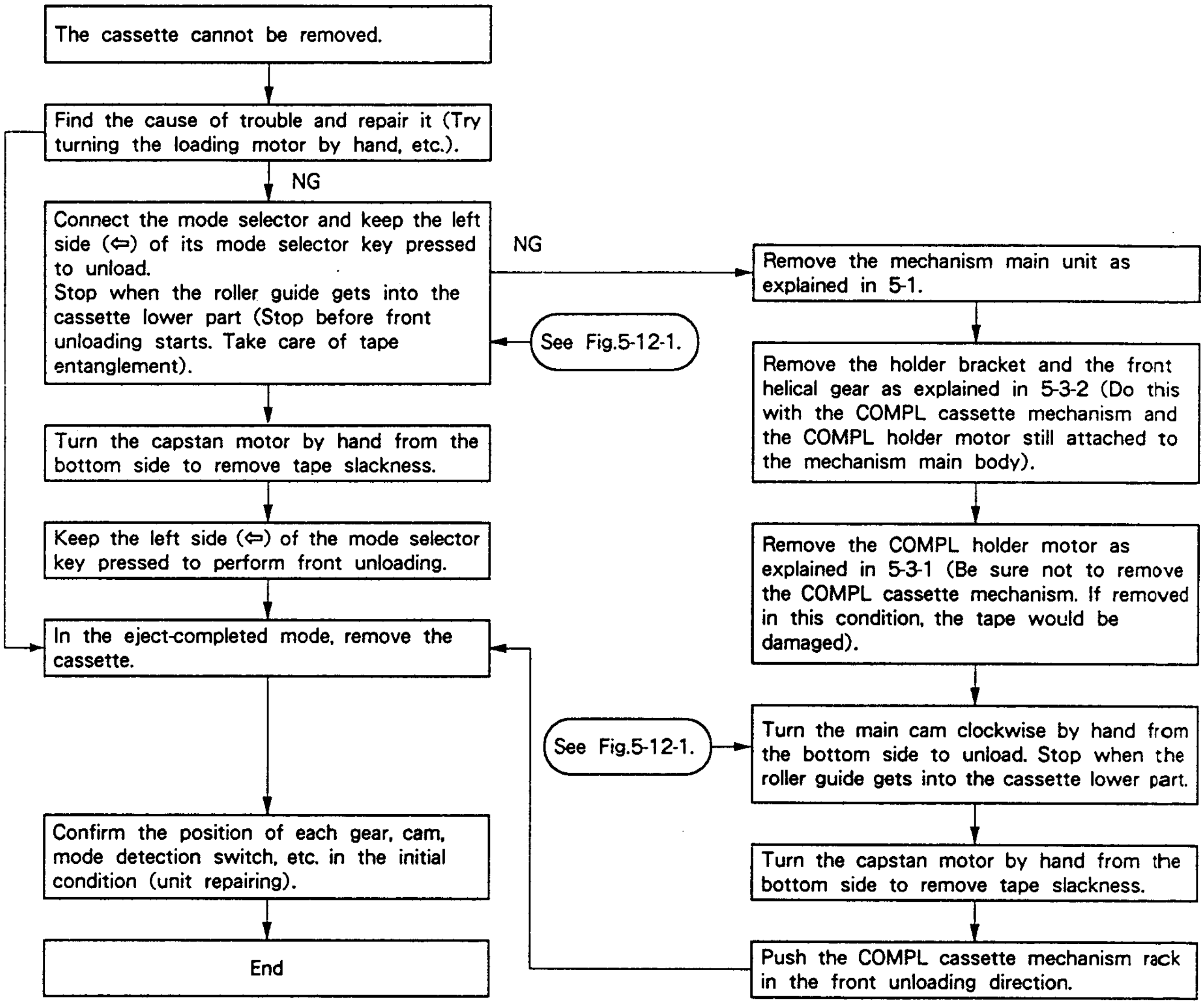

Except 2-head normal audio model.
Only 2-head normal audio model
Round Hole (SP CH-1 side)
Holes for fixing screw
Rotary erase head's lead wire (Model for flying erase capability)
Round Hole (SP CH-1 side)
Holes for fixing screw

Fig. 5-11-8. Lower Drum

5-12. HOW TO PROCEED WHEN THE CASSETTE CANNOT BE REMOVED



The cassette cannot be removed.

Find the cause of trouble and repair it (Try turning the loading motor by hand, etc.).

NG

Connect the mode selector and keep the left side (⇦) of its mode selector key pressed to unload. Stop when the roller guide gets into the cassette lower part (Stop before front unloading starts. Take care of tape entanglement).

See Fig.5-12-1.

Turn the capstan motor by hand from the bottom side to remove tape slackness.

Keep the left side (⇦) of the mode selector key pressed to perform front unloading.

In the eject-completed mode, remove the cassette.

Confirm the position of each gear, cam, mode detection switch, etc. in the initial condition (unit repairing).

End

NG

Remove the mechanism main unit as explained in 5-1.

Remove the holder bracket and the front helical gear as explained in 5-3-2 (Do this with the COMPL cassette mechanism and the COMPL holder motor still attached to the mechanism main body).

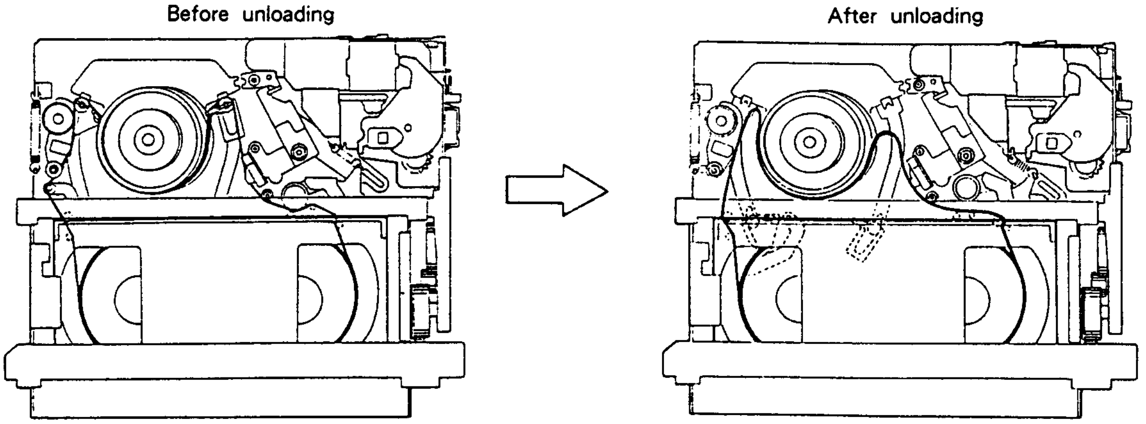
Remove the COMPL holder motor as explained in 5-3-1 (Be sure not to remove the COMPL cassette mechanism. If removed in this condition, the tape would be damaged).

See Fig.5-12-1.

Turn the main cam clockwise by hand from the bottom side to unload. Stop when the roller guide gets into the cassette lower part.

Turn the capstan motor by hand from the bottom side to remove tape slackness.

Push the COMPL cassette mechanism rack in the front unloading direction.



Before unloading

After unloading

Perform unloading using the mode selector.

First rotate the capstan motor by hand from the bottom to take-up the tape slack, and perform front-unloading using the mode selector.

Fig. 5-12-1

6. MECHANISM ADJUSTMENT

6-1. OPERATING THE MECHANISM WITH NO CASSETTE INSERTED (See Fig. 6-1-1.)

1) Attach black vinyl tape to the T. END and T. TOP sensors to prevent light from entering.
2) Push the TRAY LOCK LEVER in the direction of the arrow to maintain the unlocked condition. Release the lever just before the TRAY starts moving down.
3) In this condition, operation is possible in every mode. However, the following procedures are necessary to operate the unit in the REC, REW and R-SEARCH modes.

REC mode :	Push the SAFETY SW LEVER to turn the SAFETY SWITCH (Erasure Prevention Switch) ON, then press the REC button. If the SAFETY SWITCH is not turned ON, the unit will enter the EJECT mode.
REW/R-SEARCH :	After pressing the REW button, turn the TAKE-UP REEL ASS'Y by hand. Otherwise, the reel sensor will operate, setting the INITIAL mode after 2 to 3 seconds.

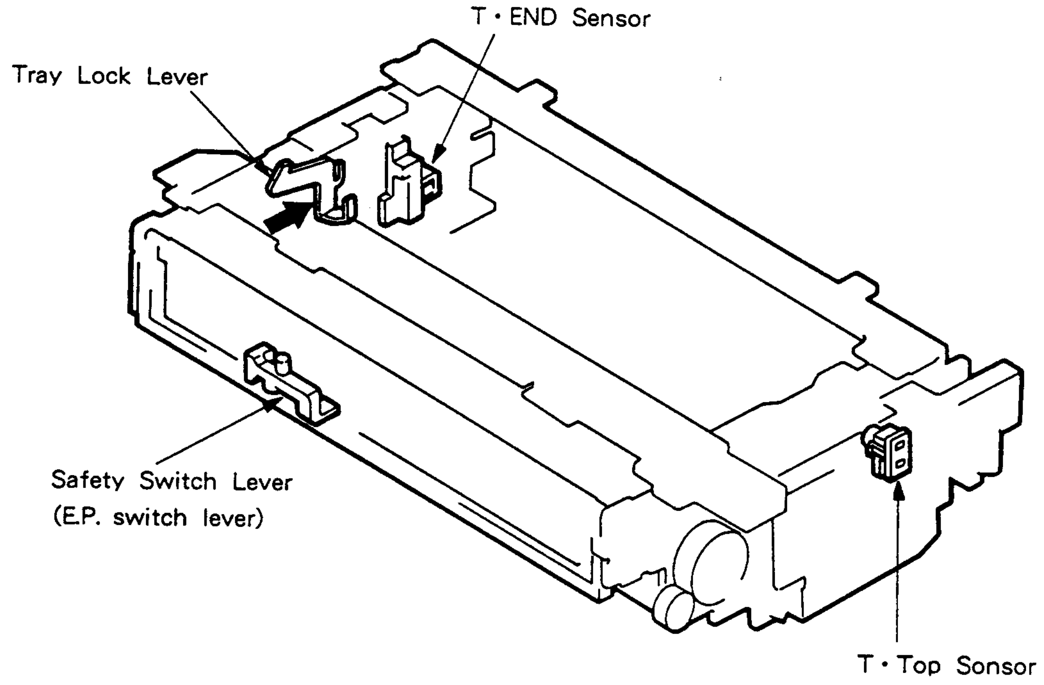


Fig. 6-1-1. Preparations for Adjustment

6-2. REEL TABLE HEIGHT ADJUSTMENT AND TORQUE CHECK

6-2-1. Reel Table Height (See Fig. 6-2-1.)

If the SUPPLY REEL ASS'Y or the TAKE-UP REEL ASS'Y is replaced, it will be necessary to adjust the REEL TABLE height.

(1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
(2) Attach the cassette stand plate gauge (VHJ-0001) and slide the gauge in the direction of the arrows.
(3) Confirm that, when the gauge stops, the REEL TABLEs are not in contact with surface A of the plate and are in contact with surface B.
(4) If the REEL TABLE is in contact with surface A, remove a spacer and check again.
(5) If the REEL TABLE is not in contact with surface B, add a spacer and check again.
(6) Remove the cassette stand plate gauge.
(7) Set the EJECT mode with the mode selector.
(8) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

Note :

- Adjust the reel table height by adding or removing spacers (0.13t, 0.25t, 0.3t, 0.4t and 0.5t) as appropriate so that the height meets the specifications. Use the same method for both the TAKE-UP REEL TABLE and the SUPPLY REEL TABLE.
  (The 0.5t washer is included as the standard washer for the SUPPLY REEL ASS'Y. The 0.4t washer is included as the standard washer for the TAKE-UP REEL ASS'Y.)
- If the height of the reel table is not within the specified value, the tape edge might be damaged as a result, or the tape path adjustment might not be possible to make.

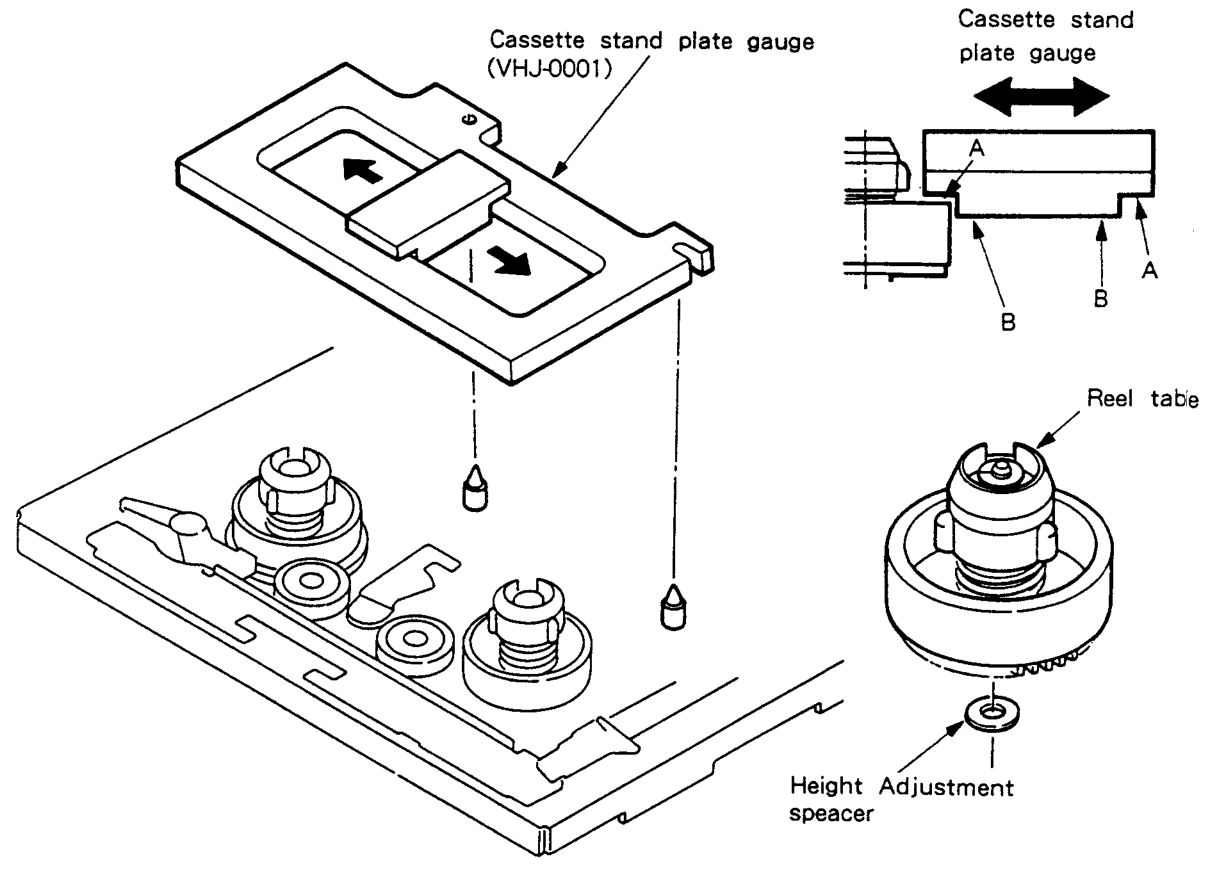

Cassette stand plate gauge (VHJ-0001)
Cassette stand plate gauge
A
A
B
B
Reel table
Height Adjustment speacer

Fig. 6-2-1 . Reel Table Height Adjustment

6-2-2. Torque Check (See Fig. 6-2-2.)

1) Set the unit to operating condition without a cassette inserted as instructed in 6-1.
2) Measure the SUPPLY REEL TABLE torque in the REW mode, and confirm that it is 750gcm or more. Perform this measurement keeping the torque gauge in a fixed position with your hand (locked torque).
3) Measure the TAKE-UP REEL TABLE torque in the F.FWD mode, and confirm that it is 600gcm or more (locked torque).
4) Measure the TAKE-UP REEL TABLE torque in the playback mode (SP tape speed), and confirm that it is within 100 through 160gcm (locked torque).
5) Measure the SUPPLY REEL TABLE torque in the REV (F-SEARCH) mode, and confirm that it is within 150 through 240 gcm (locked torque).
6) After confirming that torque readings are within the specifications for each mode, check the following :
   ⓐ Dirt on the capstan motor and the REEL PULLEY groove.
   ⓑ Deterioration of the REEL DRIVE BELT.
   ⓒ Deterioration of the FRICTION GEAR ASS'Y felt (torque during playback).
   ⓓ Wear and damage of the COMPL CLUTCH MECHANISM and the reel drive system gears.

Note1 : Items ⓑ, ⓒ and ⓓ require replacement if found defective.

Note2 : The measured value of torque during FF and REW represents the value 2 seconds after starting.

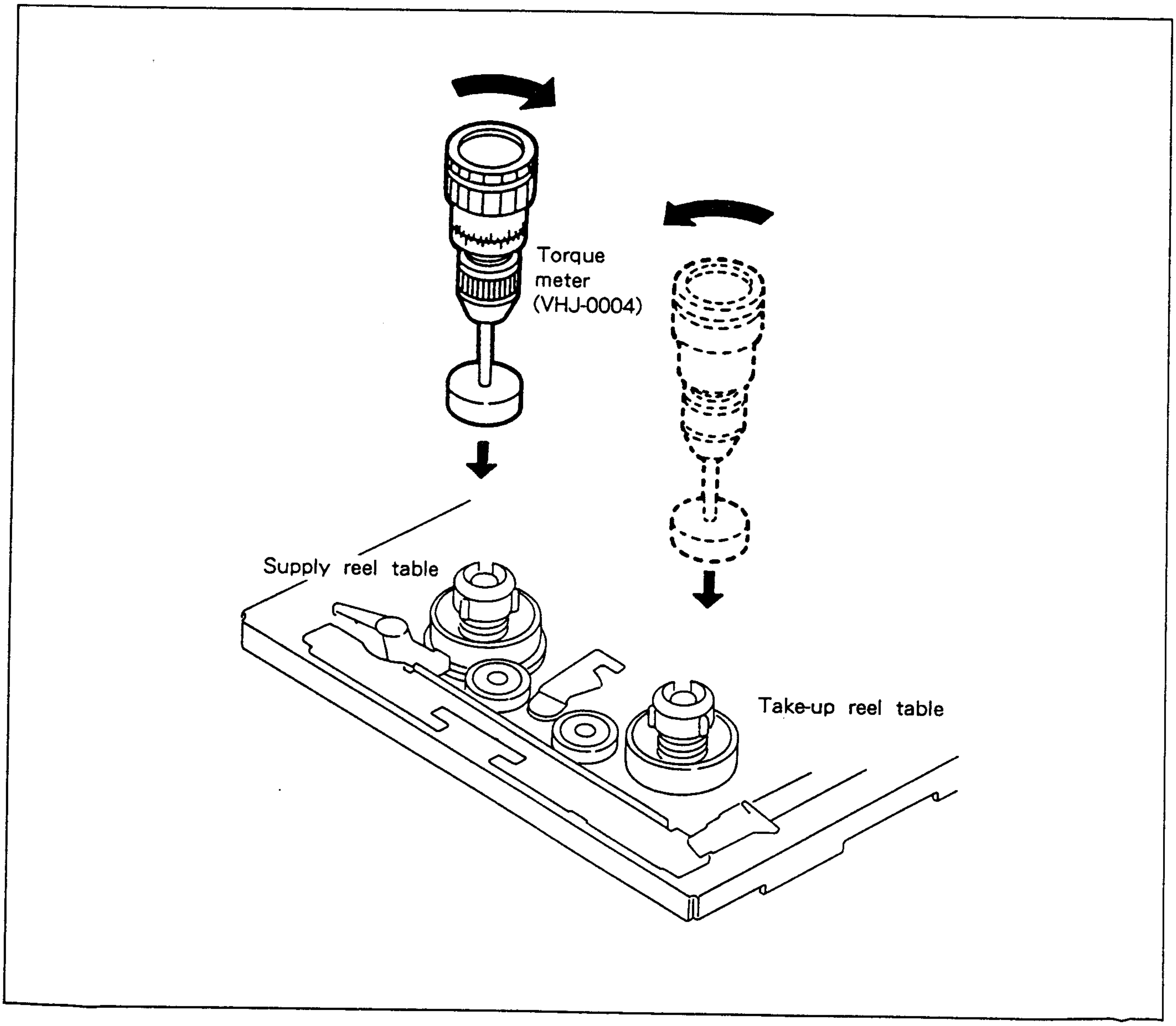


Fig. 6-2-2 Checking REW/FF/PLAY Torque

6-3. TENSION POLE (BACK TENSION GUIDE) POSITION ADJUSTMENT AND BACK TENSION TORQUE CHECK

6-3-1. Tension Pole (Back Tension Guide) Position Adjustment (See Fig. 6-3-1.)

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Set the PLAY mode with the mode selector (VHJ-0050).
3) Attach the position adjustment gauge (VHJ-0049) ①.
4) Confirm that the tension pole ② is within the position adjustment gauge frame.
5) In case the tension pole is not within the above-mentioned frame, adjust it by loosening the screw ④ a little and changing the mounting position of the BAND HOLDER ⑤ in the direction of the arrow Ⓐ.
6) Remove the position adjustment gauge ①.
7) Set the EJECT mode with the mode selector.
8) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
9) Confirm that back tension torque is within 50 ± 10gcm, as instructed in 6-3-2 below.

6-3-2. Back Tension Torque Check (See Fig. 6-3-1.)

1) Attach the cassette torquemeter (VHJ-0016) and set the PLAY mode.
2) Confirm that back tension torque is within 47 ± 5gcm.
3) In case back tension torque does not meet the above specification, proceed as follows :

ⓐ Clean the portion where the brake band (BAND HOLDER ASS'Y) ⑦ of the SUPPLY REEL ASS'Y ⑥ makes contact.

ⓑ Confirm that the brake band of the BAND HOLDER ASS'Y ⑦ does not make wear and that it is clean. If wear or dirt is found, replace the band holder assembly ⑦ as instructed in 5-7-3.

ⓒ Replace the TENSION LEVER ASS'Y SPRING COIL ⑧.

Note : Always follow procedures in 6-3-1. Tension Pole Position Adjustment after performing ⓐ, ⓑ and ⓒ.

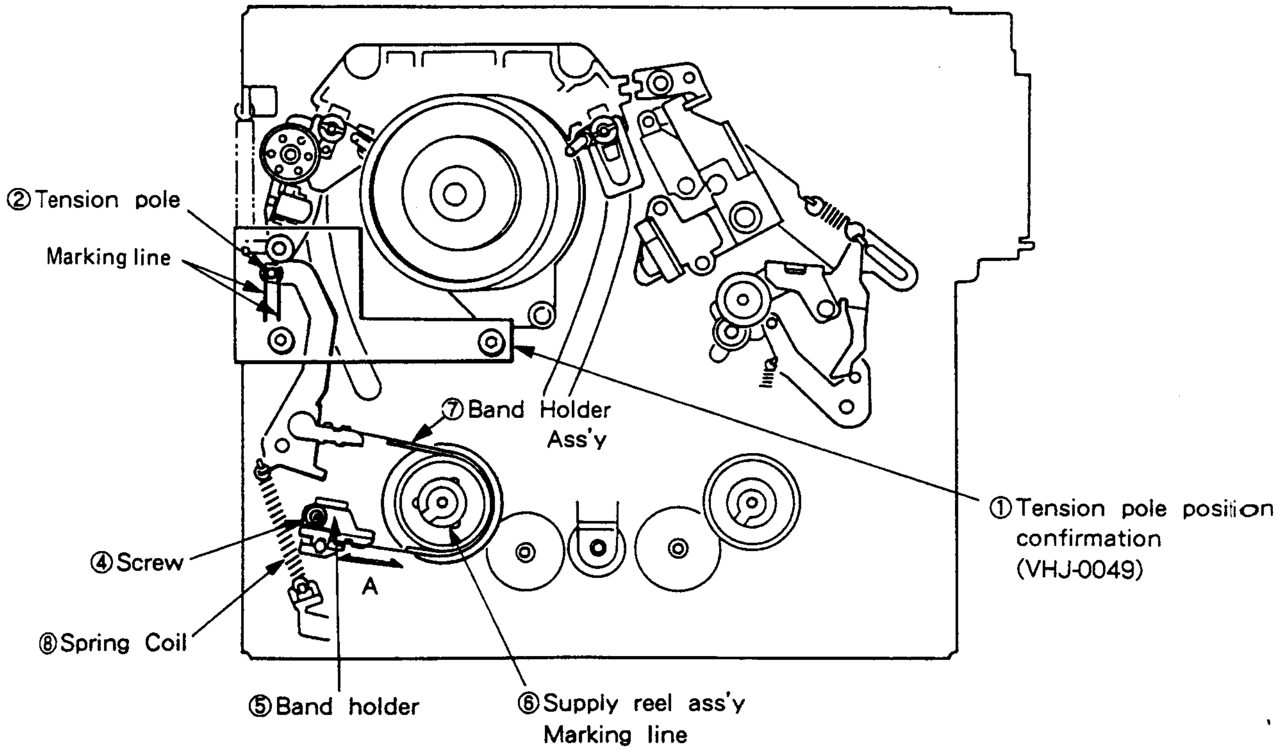

②Tension pole
Marking line
⑦Band Holder Ass'y
①Tension pole position confirmation (VHJ-0049)
④Screw
A
⑧Spring Coil
⑤Band holder
⑥Supply reel ass'y Marking line

Fig. 6-3-1. Tension Pole Positioning Adjustment

6-4. TAPE PATH ADJUSTMENT

The tape path mechanism is precisely adjusted at the factory. Normally no readjustment is required, but checking and/or adjustment is necessary when parts of the tape path mechanism among those shown in the figure below (See Fig. 6-4-1.) have been removed or replaced after a long period of use. This operation consists of adjusting the various guides so that the tape drawn out from the supply reel runs smoothly along the DRUM (CYLINDER) lead surface. A way of grasping the tape path condition by electronic means is monitoring the video head output envelope waveform with an oscilloscope. However, the fact that visual observation is essential in order to know whether the tape is running through the various guides in a smooth and natural way should be kept in mind when checking and adjusting.
Also remember that the position of tape guides is not greatly affected by the replacement of the UPPER DRUM (UPPER CYLINDER) or the COMPL DRUM (COMPL CYLINDER), provided that it is correctly performed, and that only the replaced parts should be adjusted after replacing a tape guide or COMPL HEAD BRACKET, since the position of the other tape guides shall not change considerably.

6-4-1. Preparations for Adjustment

(1) Clean the tape transport surfaces (See Fig. 6-4-1.).

(2) Connect the oscilloscope. Connect the channel 1 probe to the envelope waveform test point, and the channel 2 probe to the SW30 (RF SW P) test point. During adjustment, apply a trigger to the low side of the SW30 (RF SW P) in order to monitor the waveform output from channel 1 of the video head.

Note : Since oscilloscope connection points differ according to the model, refer to the "Test Point for Tape Path Adjustment" allocation figure in the electric circuit adjustment section of the service manual book.

(3) Use a dentist's mirror for visual observation of tape path condition.

(4) Use a nut box (VHJ-0048) for adjustment of the fixed guides.

(5) Use an eccentric driver (VHJ-0003) for adjustment of the guide rollers.

(6) When adjusting height of the fixed guide, guide rollers or COMPL head bracket, turn the special nut or the upper flange clockwise to push the tape downward, and counterclockwise to make the tape rise up.

(7) Do not use the damaged cassette tapes for tape path adjustment.

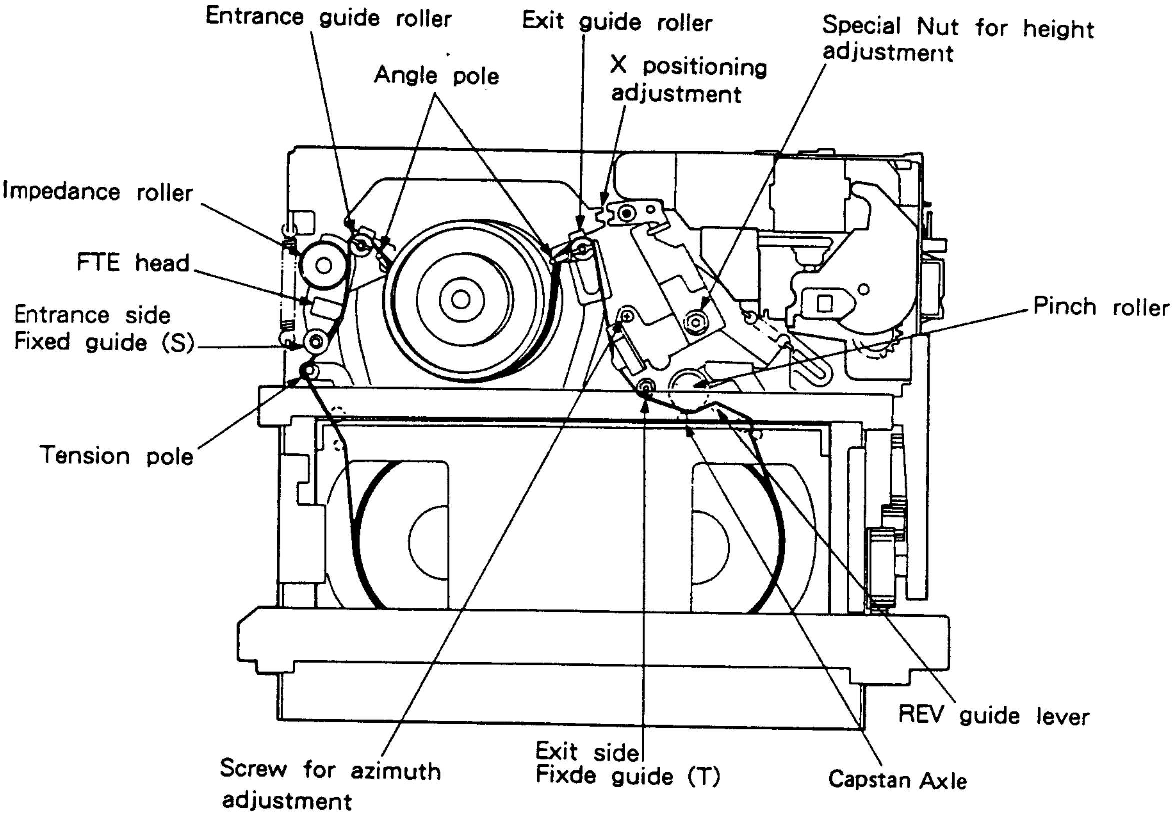

Entrance guide roller
Exit guide roller
Special Nut for height adjustment
Angle pole
X positioning adjustment
Impedance roller
FTE head
Entrance side Fixed guide (S)
Pinch roller
Tension pole
REV guide lever
Screw for azimuth adjustment
Exit side Fixde guide (T)
Capstan Axle

Fig. 6-4-1. Preparation for Adjustment

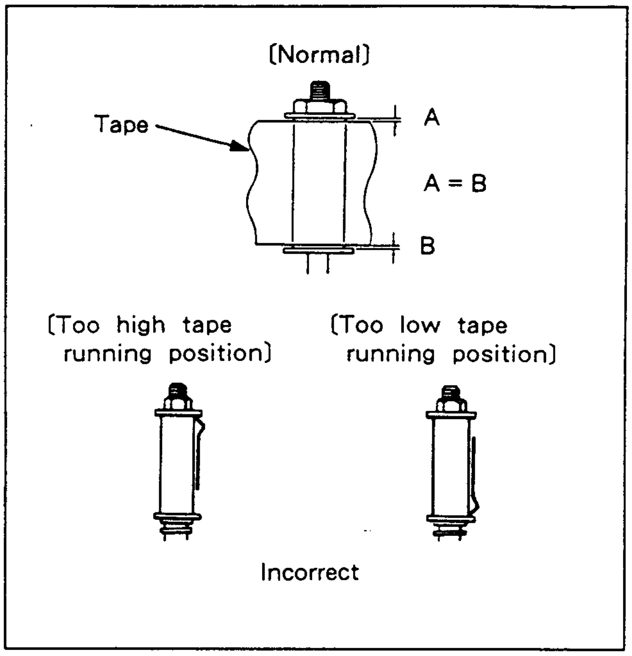
6-4-2. Adjustment by Visual Observation after Guide Roller, Fixed Guide or COMPL Head Bracket Replacement

Perform this adjustment after removing or replacing any of the above parts. Only for the replaced or removed parts, play back an alignment tape (VHJ-0009) beforehand and adjust height by visual observation.

(1) Exit Side Fixed Guide (See Fig. 6-4-2.)
Adjust so that the tape upper edge does not make contact with the fixed guide upper flange, and the tape lower edge does not make contact with the fixed guide lower flange. Gaps A and B should remain equal.

(2) Guide Rollers (See Fig. 6-4-3.)
The tape should not be curled by the guide roller upper and lower flanges. It should also run smoothly, without moving up and down on the DRUM (CYLINDER) lead surface.

Note : An excessive guide roller pressure may cause tape damage.


[Normal]
Tape
A
A = B
B
[Too high tape running position]
[Too low tape running position]
Incorrect

6-4-2. (1) Pre-set For Exit Side Fixed Guide

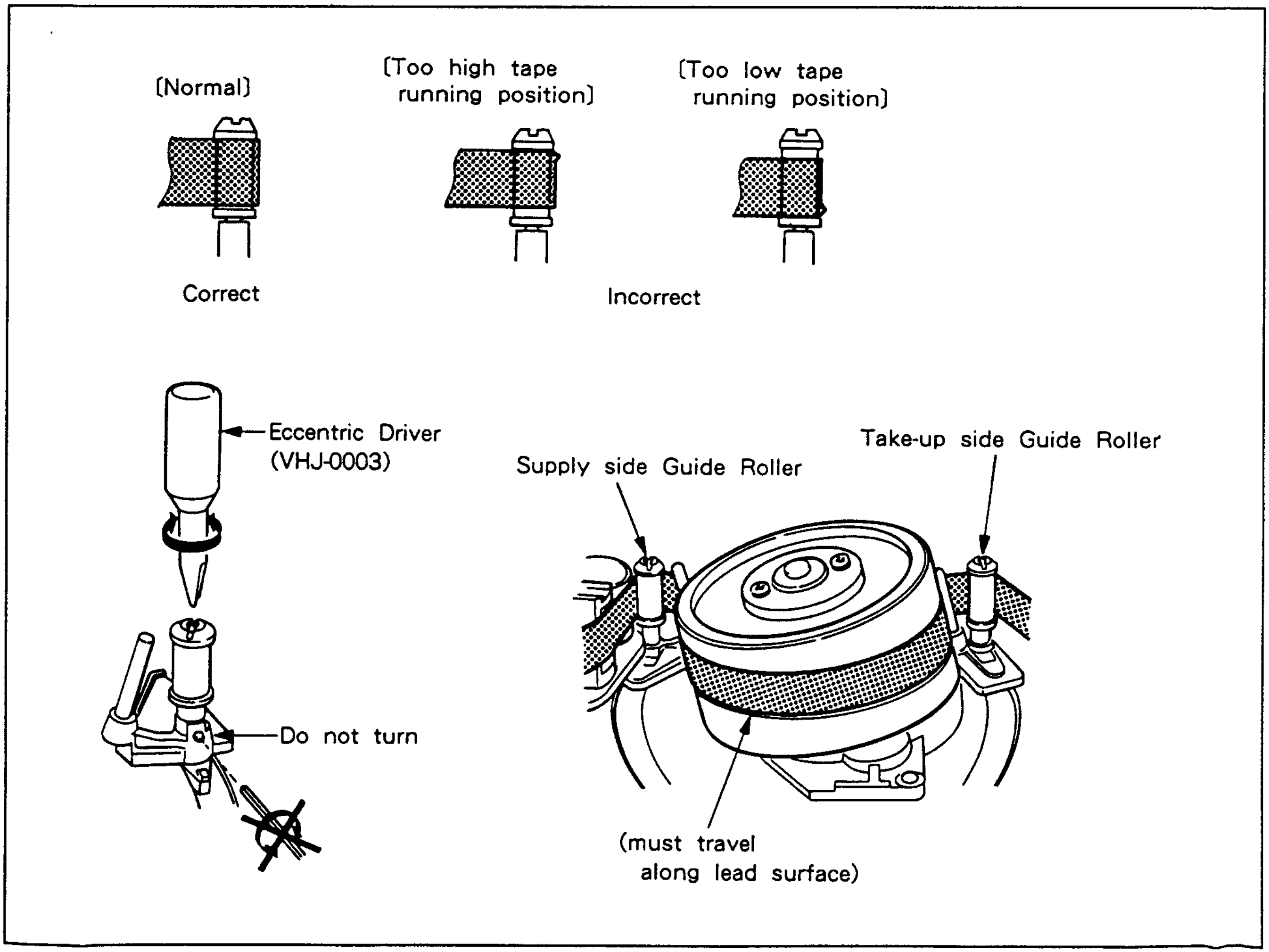

[Normal]
[Too high tape running position]
[Too low tape running position]
Correct
Incorrect
Eccentric Driver (VHJ-0003)
Do not turn
Supply side Guide Roller
Take-up side Guide Roller
(must travel along lead surface)

Fig. 6-4-3. (2) Pre-set for Guide Roller

(3) COMPL Head Bracket (ACE Head) (See Fig. 6-4-4.)

Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

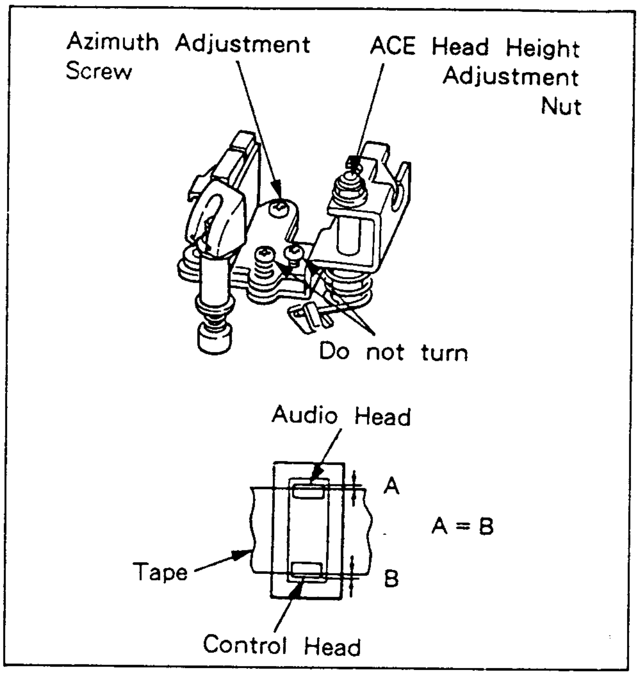

Azimuth Adjustment Screw
ACE Head Height Adjustment Nut
Do not turn
Audio Head
A
A = B
Tape
B
Control Head

Fig. 6-4-4. **(3) Pre-set for Compl Head Bracket**

6-4-3. Entrance Side Fixed Guide (S) Height Adjustment (See Fig. 6-4-5.)

The P90 mechanism entrance side fixed guide comes in two types : the one in this unit is equipped with an upper flange and a spring coil, and it requires height adjustment. The other type is not provided with an upper flange and a spring coil. Height is naturally set when the special nut is fastened, so adjustment is not required.

For units with an upper flange, perform height adjustment as explained below. Even for types which do not require height adjustment, check whether the lower tape edge runs along the lower flange. Be careful not to fasten the special nut excessively, causing the axle to run idle.

1) Rotate the fixed guide (S) counterclockwise to lift the tape somewhat, then insert the fixed guide height gage (VHJ-0053) into the lower side of the fixed guide (S) lower flange.
2) Rotate the fixed guide (S) special nut clockwise a little at a time until the lower flange makes contact with the upper surface of the fixed guide height gage, causing a slight drag.
3) After rotating the special nut 90° counterclockwise, remove the Axed guide height gauge.
4) After adjusting the guide rollers in section 5-4-4, play back the alignment tape (VHJ-0009). Confirm that the tape lower edge runs in close contact with the fixed guide (S) lower flange. In case too much pressure has left a gap between the tape and the lower flange, or excessive lifting has caused curling of the tape lower edge, perform fine adjustment. However, do not adjust the special nut beyond 90° clockwise and 45° counterclockwise.

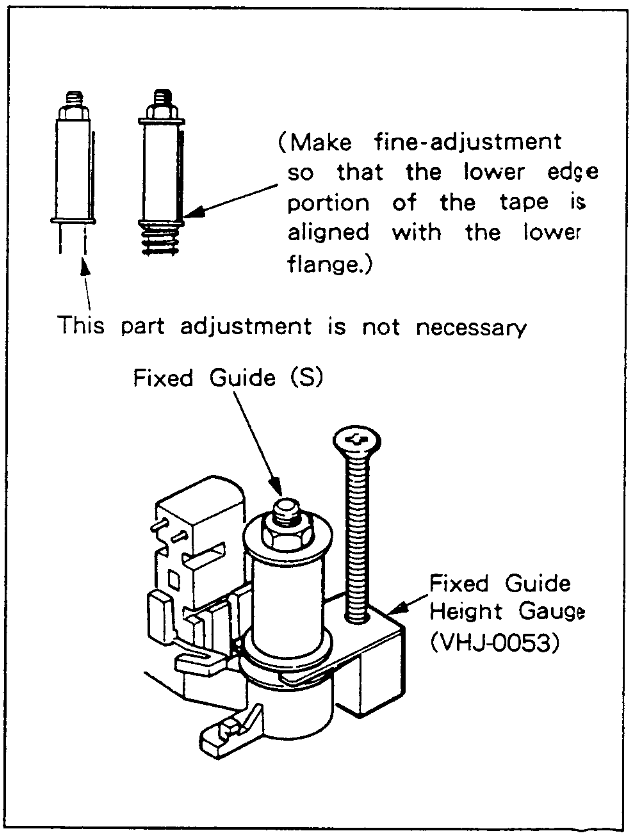

(Make fine-adjustment so that the lower edge portion of the tape is aligned with the lower flange.)
This part adjustment is not necessary
Fixed Guide (S)
Fixed Guide Height Gauge (VHJ-0053)

Fig. 6-4-5. Entrance Side Fixed Guides

6-4-4. Guide Roller Adjustment (See Fig. 6-4-6.)

1) Play back the alignment tape (VHJ-0009), press the tracking control key and adjust the envelope waveform to the maximum level.
2) Loosen the entrance and exit guide rollers by rotating them counterclockwise, then rotate them clockwise alternately until they are fastened and a flat video output waveform is obtained.
3) Confirm that the envelope waveform is not deformed, and check visually that no curling occurs at the guide roller upper and lower flanges.
4) Press the tracking control key and set the envelope waveform level to approx. 50% of the maximum. In this condition, confirm whether the envelope waveform is flat. It will not, showing valleys or peaks at the first half (entrance) or second half (exit), if the guide roller pressure is excessive or insufficient.

   In case there is unevenness in the first half (entrance), adjust the entrance side guide roller. If the second half (exit) shows trouble, adjust finely the exit side guide roller.

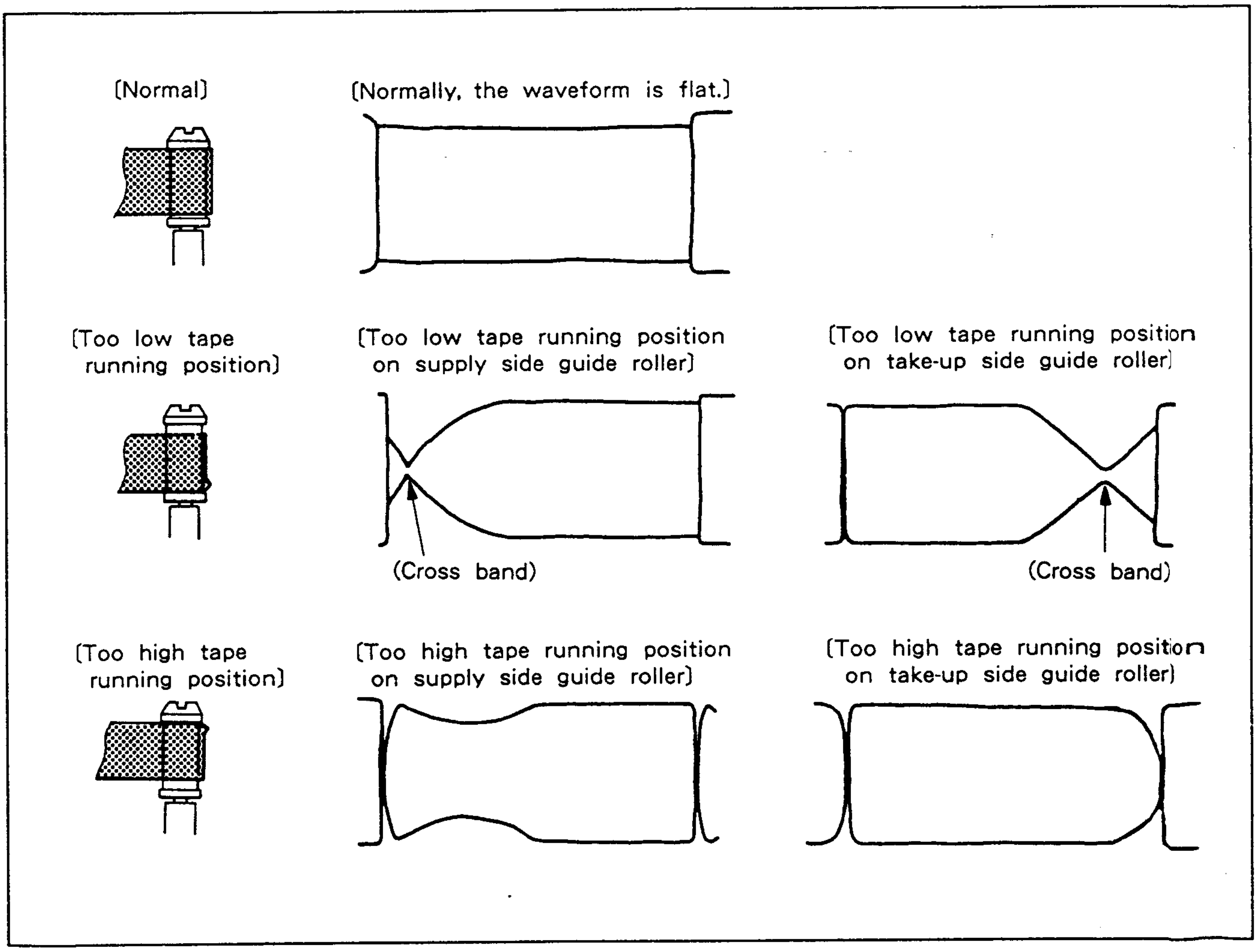

(Normal)
(Normally, the waveform is flat.)
(Too low tape running position)
(Too low tape running position on supply side guide roller)
(Too low tape running position on take-up side guide roller)
(Cross band)
(Cross band)
(Too high tape running position)
(Too high tape running position on supply side guide roller)
(Too high tape running position on take-up side guide roller)

Fig. 6-4-6. Guide Roller Adjustment

6-4-5. Exit Side Fixed Guide (T) Adjustment (See Fig. 6-4-7.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Rotate the special nut counterclockwise so that the lower flange lifts the tape until its lower edge is slightly curled.
3) Rotate the special nut clockwise a little at a time until curling of the tape lower edge is removed.
4) Confirm at each mode (PLAY, F.SEARCH, R. SEARCH, F.F and REW) that the tape runs along the lower flange and that no curling occurs.

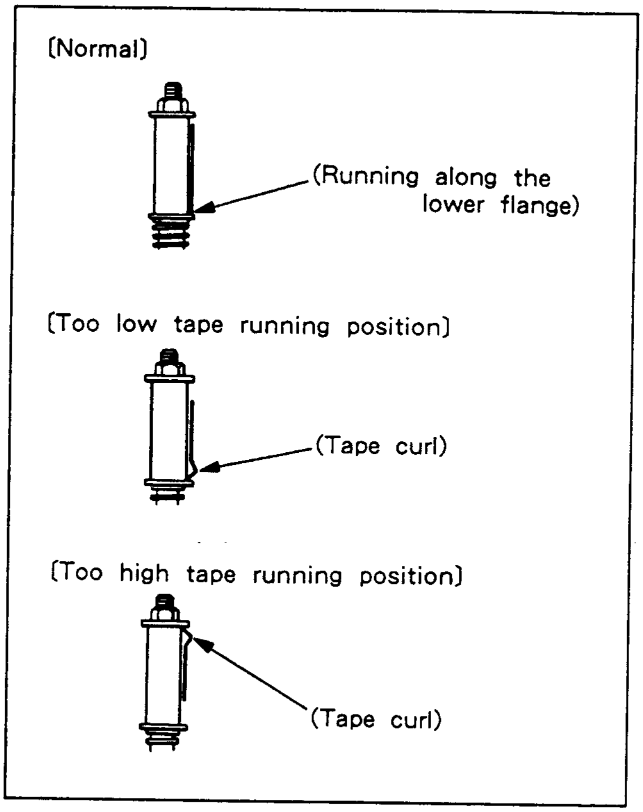

[Normal]
(Running along the lower flange)
[Too low tape running position]
(Tape curl)
[Too high tape running position]
(Tape curl)

Fig. 6-4-7. Fixed Guide (T)

6-4-6. COMPL Head Bracket (ACE Head) Adjustment

(1) Height Adjustment and Azimuth Adjustment (See Fig. 6-4-8.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Monitor the audio output waveform with the oscilloscope.
3) Rotate the azimuth adjustment screw until the audio output waveform amplitude is maximum.
4) After loosening the ACE head height adjustment special nut, rotate it slowly clockwise until amplitude of the audio output waveform is maximum, then adjust it finely clockwise to the point just before the said waveform amplitude begins to decrease.
5) Rotate the azimuth adjustment screw until amplitude of the audio output waveform is maximum.
6) Confirm that the audio output waveform amplitude does not fluctuate.

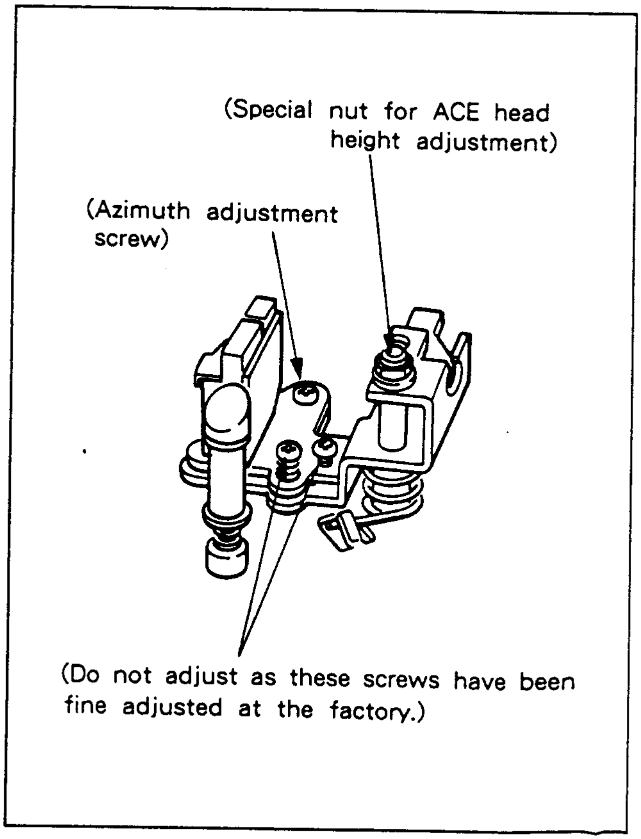

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Do not adjust as these screws have been fine adjusted at the factory.)

Fig. 6-4-8. Compl Head Bracket

(2) Tracking (X Value) Adjustment (See Fig. 6-4-9.)

1)Load the alignment tape (VHJ-0009) and set the PLAY mode.
2)Set tracking to the center position with the tracking control key (See Note below).
3)Rotate the stopper bracket fixing screw 180° counterclockwise.
4)Monitor the video head output envelope waveform with the oscilloscope.
5)Adjust the stopper bracket position so that amplitude of the envelope waveform becomes maximum at the tracking center and the envelope waveform amplitude changes by the same amount when shifting the tracking center by pressing the plus (+) and minus (−) tracking control keys.
6)Tighten the fixing screw.
7)(Model for LP mode tape speed capability)
Playback the alignment tape (VHJ-0052) and set the tracking to the center using a tracking control key.
Then confirm that the playback picture on screen is normal. If not, Make readjustment by referring to items 1) through 7). To readjust, playback VHJ-0009 and finely adjust the position of the stopper bracket within the range in which the amplitude of the envelope waveform can be held to a maximum.
8)Perform servo circuit PB PHASE (Switching position) adjustment.

Note : For models equipped with auto tracking, always set to the manual tracking mode before adjustment. To confirm the tracking center position, press the tracking keys (+, −) and observe the front panel clock display. It will read "T − : −" at the tracking center, "T − : , T − − : " when keeping the minus (−) key pressed, and "T : −, T : − −" when keeping the plus (+) key pressed. The time indication will be restored 2 to 3 seconds after the tracking keys are released.

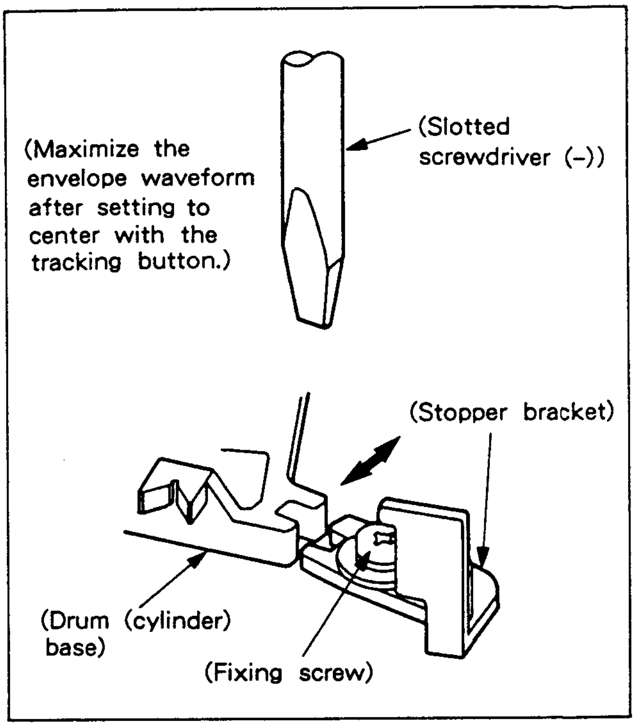

(Maximize the envelope waveform after setting to center with the tracking button.)
(Slotted screwdriver (−))
(Stopper bracket)
(Drum (cylinder) base)
(Fixing screw)

Fig. 6-4-9

6-4-7. Checking after Adjustment

Tape running may show a slight change depending upon the type of the cassette tape (thick or thin tape), the start, middle, or end of cassette tape winding, etc. After performing the tape path adjustment with use of an alignment tape, be sure to check the following points. Incidentally, the alignment tape to be used should be E-180 or E-240 cassette should be a good one without any damage to it.

(1) Try to play back the alignment tape (VHJ-0009) and confirm that the envelope waveform rise immediately and that there is no fluctuation in the envelope waveform and the audio output waveform.

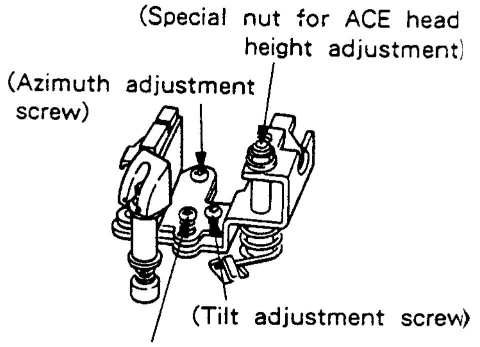
(2) Load a cassette tape E-180 and start recording operation in the standard mode. 1 kHz should be fed to the audio input terminal when recording. After recording, the following points should be checked.

1. When the recorded portion is played back, the envelope waveform rise immediately, and no fluctuation in the envelope waveform is observed. Also, no speed drop occurs during the first half period or the last half period. Further, check to be sure that no fluctuation occurs in the audio waveform. Also confirm that neither the tape curling or derailing is caused on the upper or lower flange and the on the read side of the drum.
2. Confirm that no tape curling or derailing occurs in the upper or lower flange of each tape guide and the read side of the drum during each mode of operation, namely, FF, REW, F. SEARCH, and R. SEARCH.
3. Confirm that the envelope waveform rise immediately after changing the mode directly to the PLAY from each mode of FF, REW, F. SEARCH, R. SEARCH, or POWER OFF (INITIAL) and that no tape curling or derailing occurs in the upper or lower flange of the each tape guide and on the read side of the drum.

(3) Load a E-240 cassette tape and perform recording operation in the SP mode. 1 kHz should be fed to the audio input terminal when recording. Now, confirm that the envelope waveform rise immediately upon starting the playback of the recorded portion, and that neither fluctuation in the envelope waveform nor a speed drop occurs during the first half period or the last half period. Also confirm that no tape curling or derailing is caused in the upper or lower flange of each tape guide and on the drum lead surface.

(4) Perform recording for 60 seconds in the SP mode at the start of E-240 cassette winding. Play back the recorded portion and repeat the F.SEARCH ↔ R.SEARCH ten times, following which confirm that no damage is done to the tape edge. If any damage is found on the tape edge, a proper step must be taken as below depending upon the symptom obserbed.

1. When a sawtooth shaped damage is caused on underside of the tape edge by the REV guide
   1) Check to see if damage is done to the tape by the REV guide.
   2) Loosen the tilt adjustment screw of the ACE head bracket by turning it 135° counterclockwise.
   3) Make readjustment of the exit side fixing guide by referring to item 6-4-5.
   4) Make readjustment of the ACE head bracket (azimuth, height and adjustment of X value) by referring to item 6-4-6.
   5) Confirm that no fluctuation in the audio level is caused by loosening the tilt adjustment screw in steps 1) and 2) above. Move the screw a little back if any fluctuation is found (but never move it back to the original position). After adjusting the tilt adjustment screw is readjusted, perform steps 3) and 4) once again.
   6) Confirm again that the E-240 cassette tape does not sustain any damage.
   7) Perform the recording and playback on the E-180 and E-240 cassette tape and confirm that no fluctuation occurs in the envelope waveform and the audio waveform.


(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Tilt adjustment screw)

(Do not adjust as this screw has been fine adjusted at the factory.)

Fig. 6-4-10 Compl Head Bracket

2. If damage in the form of a sawtooth or a streak is found on the tape edge
   1) Check if a large amount of magnetic particles is adhered to the exit-side guide roller. If magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced.
   2) Confirm if the tape is held too tightly by the exit-side guide roller, or if the last half of the envelope waveform is flat. If the type is found held too tightly, readjustment should be made by referring to 6-4-4.
   3) Recheck if the damage is still caused on the E-240 tape.
      If similar damage is still found on the tape, the exit-side guide roller should be loosened about 20° counterclockwise.
   4) Check once again that no fluctuation is caused in the envelope waveform or the audio waveform by loosening the exit-side guide roller. To do this, record and play back the E-240 cassette tape.

(5) Perform recording for 60 seconds in the SP mode at the near end of the E-240 cassette tape. Play back the recorded portion and repeat the F. SEARCH ↔ R. SEARCH ten times, following which a check should be made to see if damage is still done to the tape edge. If a damage in the form of a sawtooth or a streak is still occurred on the tape edge by the upper lounge of entrance side guide roller, proceed with the step given below.
   1) Check if a large amount of magnetic particles is adhered to the entrance-side guide roller. If the magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced with new one.
   2) Confirm if the tape is held too tightly by the entrance-side guide roller, or if the first half of the envelope waveform is flat. If the tape is found held too tightly, readjustment should be made by referring to 6-4-4.
   3) Recheck if the damage is still caused on the E-240 tape.
      If the damage is still found on the tape, the entrance-sideguide roller should be loosened aboud 20° counterclockwise.
   4) Check once again that no fluctuation is caused in the envelop waveform or the audio waveform by looseving the entrance-side guide roller. To do this, record and play back the E-240 cassette tape.

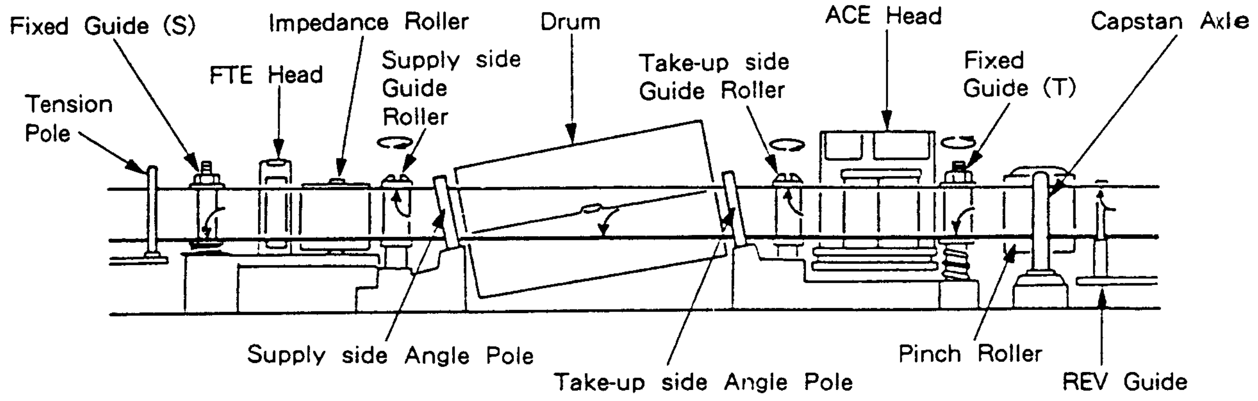


Fig. 6-4-11.

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SUPPLEMENT SERVICE TECHNICAL INFORMATION

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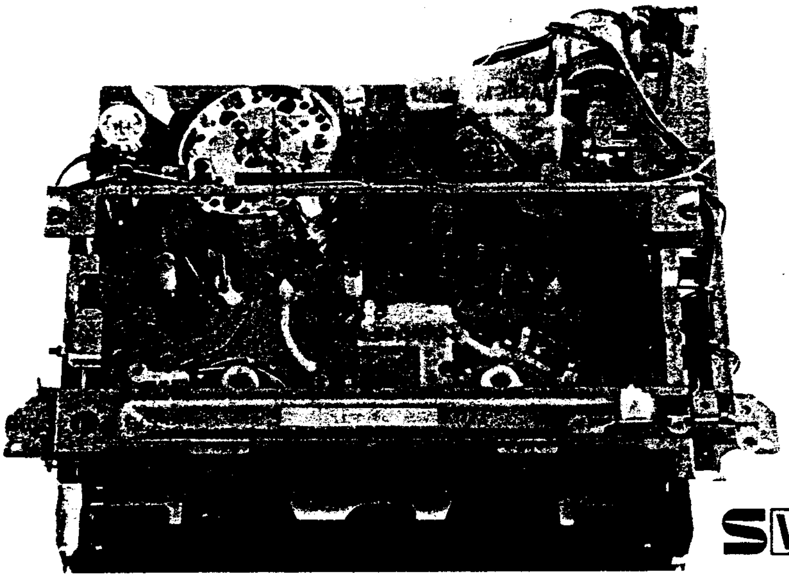
P-90 S VHS MECHANISM

Video Cassette Recorder



S VHS VHS PAL 625

Use this supplement together with the P-90 Mechanism Manual (WM-530598) of the Service Technical Information published in 1990.

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2. Sections Changed from P-90 Mechanism Issued in 1990 4
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1. OUTLINE OF P-90 S VHS MECHANISM

The reel drive system of P-90 S VHS mechanism has been newly developed based upon the P-90 mechanism. As for the mechanism composition other than reel drive system is the same as P-90 mechanism. Since only the different sections from P-90 mechanism are described in this manual, use the P-90 Mechanism Manual (Mechanism Service Technical Information) published in 1990 as well. P-90 S VHS is featured as follows;

1) Brass impedance rollers of large diameter at head drum entrance and small diameter at exit are employed in order to reduce jitter component of tape path system and to obtain the stable picture.

2) The mode transition time as shown in Fig. 1-1 is reduced, comparing with P-90 mechanism. The tape rewind time is largely reduced by FF/REW high-speed. Therefore, the following points are taken into consideration in P-90 S VHS.

	P-90 MECHANISM	P-90 S VHS MECHANISM
STOP → PLAY	1.5"	1.3"
CASSETTE IN	4.9"	4.4"
POWER OFF → PLAY	4.1"	3.6"
FF/REW REWIND TIME (E-180)	4'	2'40"

Table 1-1. **Mode Transition Time Comparison**

① Noise reduction by large driven gear
In order to reduce the noise of reel drive system in FF/REW modes, the large driven gear is employed so that proper contact ratio is obtained. A driving force between gears can be smoothly transmitted by using large gear, therefore the noise at gear engagement can be reduced.

② Change of deceleration ratio in FF/REW modes
In order to reduce the capstan motor noise, the reel pulley diameter has been changed and drive deceleration ratio is reduced as possible.

③ Brake mechanism improvement
During taking-up the tape at high-speed in FF/REW modes, if sudden brake is applied, a high tape tension is generated and the tape will be damaged by rotary head, etc. Therefore, the brake mechanism components have been improved to apply brake softly, so that the brake operation is stabilized.

④ Capstan motor control
In order to operate FF and REW modes in higher-speed, a capstan motor used as a reel driving source is newly developed to upgrade the revolutions. However, only by upgrading the revolutions, VISS signal dropout, etc. caused by tape defects and slacks can not be prevented.
And when the tape is rewound in high-speed even at the end of tape rewinding, the leader tape portion is also rewound before the tape end sensor detects and the brake is applied, thus the tape will be damaged.
In order to prevent this, the capstan motor is designed to start smoothly at the start of FF/REW modes. And the tape remaining amount detector is used to detect the specified amount (E-60:2 mm, E-180:3.6 mm) at high-speed rewind, and as soon as it reaches the specified amount, the capstan motor deceleration starts. Also in decelerating mode, a smooth deceleration is performed not to cause any tape slacks. (Refer to 1-1.)

⑤ In order to prevent the noise caused by operating at high-speed in FF/REW modes, the guide roller at drum entrance is renewed .

3) A detection switch to enable automatic discrimination of S VHS cassette tape is added. (Same type as conventional S VHS model)

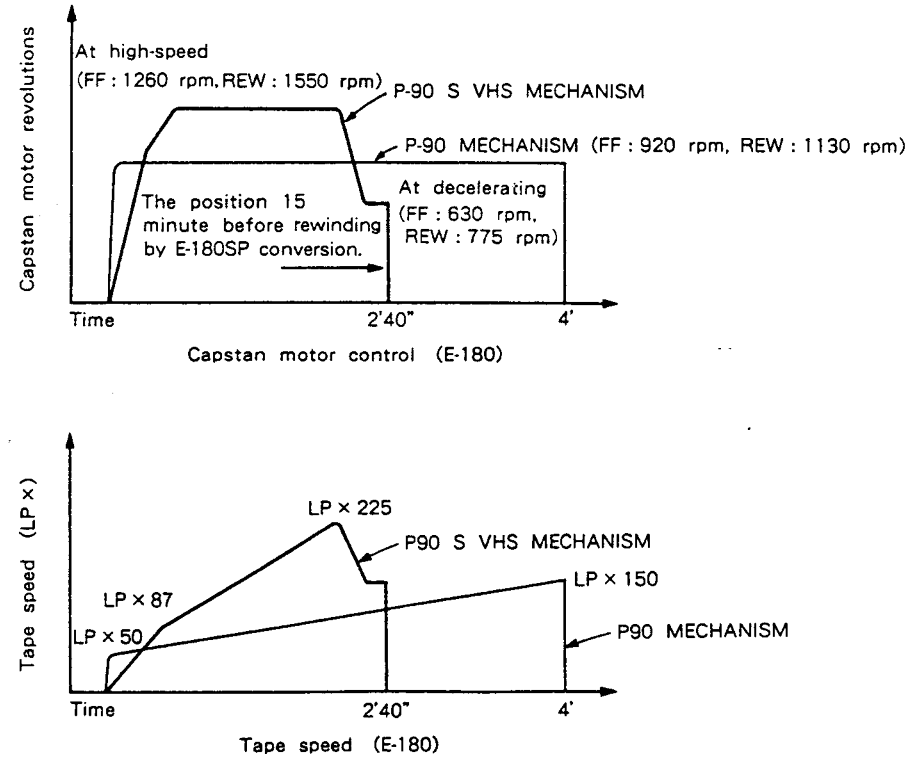
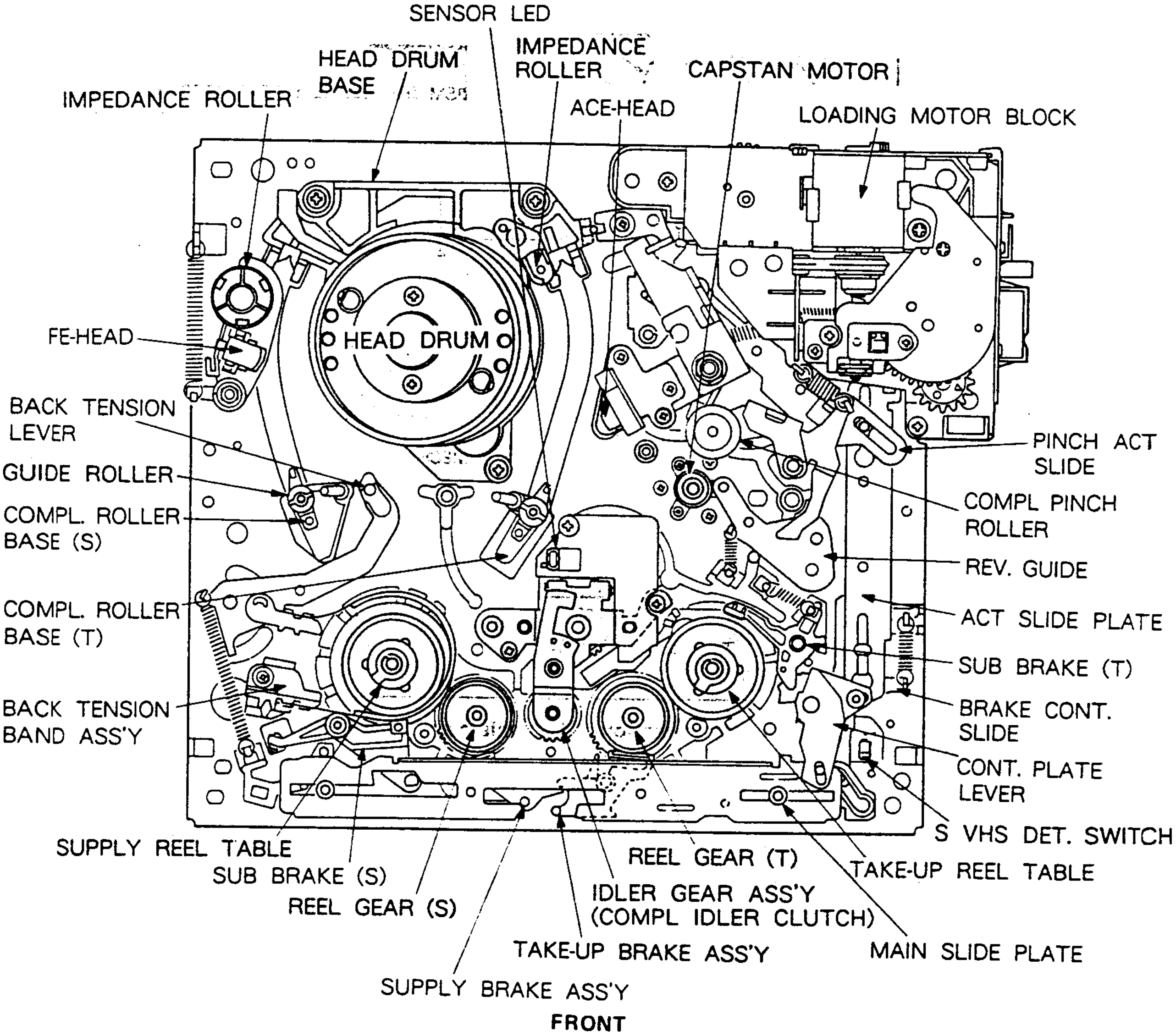


Fig. 1-1. Comparison of Conventional Mechanism and P-90 S VHS Mechanism

2. SECTIONS CHANGED FROM P90 MECHANISM ISSUED IN 1990

2-2. DESCRIPTION OF MECHANISM DRIVE

The shaded sections are different from P-90 MECHANISM.



SENSOR LED
HEAD DRUM BASE
IMPEDANCE ROLLER
IMPEDANCE ROLLER
CAPSTAN MOTOR
ACE-HEAD
LOADING MOTOR BLOCK
HEAD DRUM
FE-HEAD
BACK TENSION LEVER
GUIDE ROLLER
COMPL. ROLLER BASE (S)
COMPL. ROLLER BASE (T)
BACK TENSION BAND ASS'Y
PINCH ACT SLIDE
COMPL PINCH ROLLER
REV. GUIDE
ACT SLIDE PLATE
SUB BRAKE (T)
BRAKE CONT. SLIDE
CONT. PLATE LEVER
S VHS DET. SWITCH
TAKE-UP REEL TABLE
MAIN SLIDE PLATE
REEL GEAR (T)
IDLER GEAR ASS'Y (COMPL IDLER CLUTCH)
TAKE-UP BRAKE ASS'Y
SUPPLY BRAKE ASS'Y
SUPPLY REEL TABLE
SUB BRAKE (S)
REEL GEAR (S)
FRONT

Fig. 2-1. TOP VIEW OF MECHANISM (INITIAL MODE)

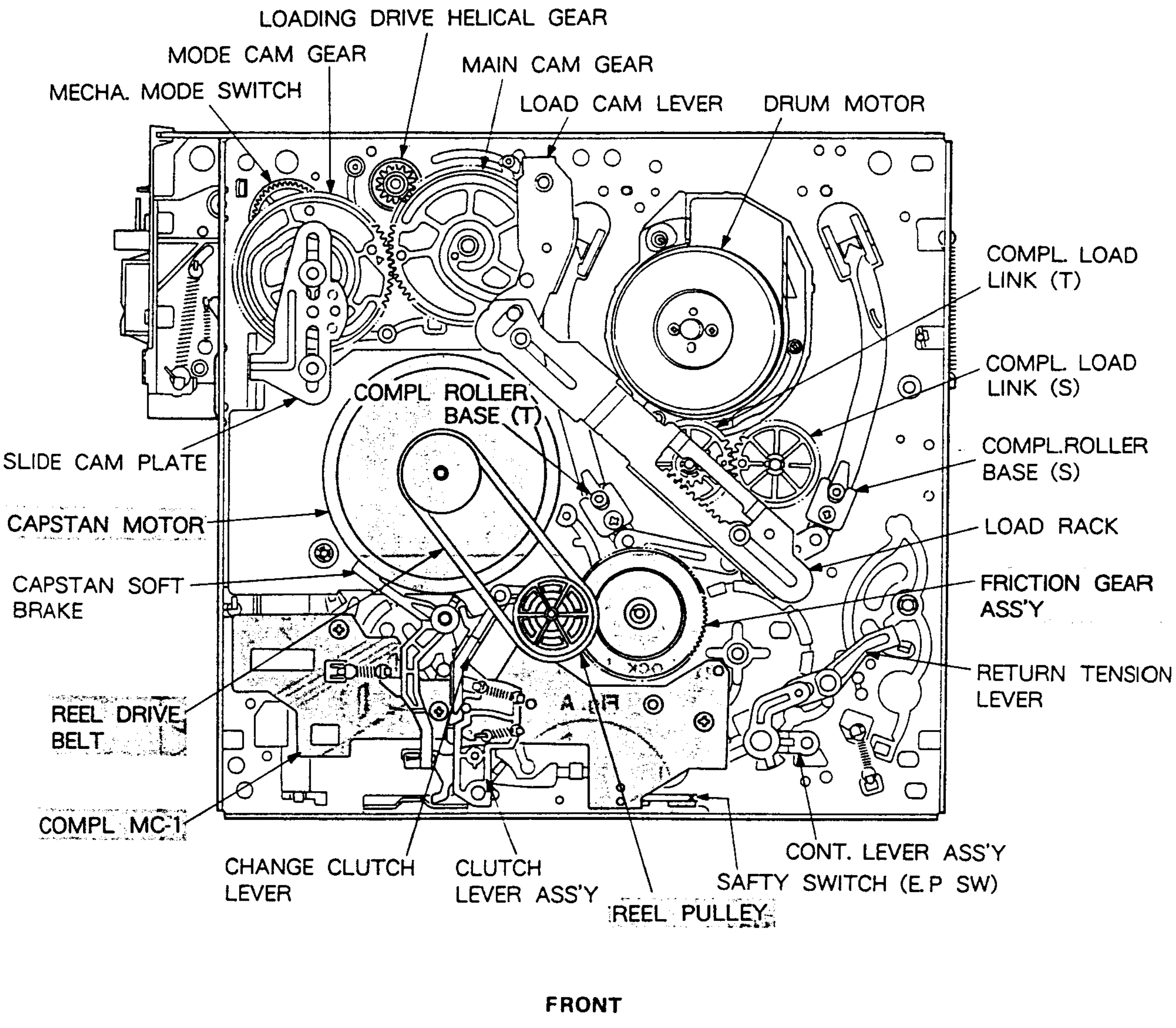

LOADING DRIVE HELICAL GEAR
MODE CAM GEAR
MECHA. MODE SWITCH
MAIN CAM GEAR
LOAD CAM LEVER
DRUM MOTOR
COMPL. LOAD LINK (T)
COMPL. LOAD LINK (S)
COMPL.ROLLER BASE (S)
LOAD RACK
FRICTION GEAR ASS'Y
RETURN TENSION LEVER
COMPL. ROLLER BASE (T)
SLIDE CAM PLATE
CAPSTAN MOTOR
CAPSTAN SOFT BRAKE
REEL DRIVE BELT
COMPL. MC-1
CHANGE CLUTCH LEVER
CLUTCH LEVER ASS'Y
REEL PULLEY
CONT. LEVER ASS'Y
SAFTY SWITCH (E.P SW)
FRONT

Fig. 2-2. BOTTOM VIEW OF MECHANISM (INITIAL MODE)

5-1. MECHANISM MAIN UNIT (See Fig. 5-1-1.)

1. Removal

1) Remove the connectors of the COMPL MC-3 and the COMPL HEAD BRACKET.
2) Remove the flexible cable ① connecting the COMPL CYLINDER to the PRE-AMP UNIT ③ (See Fig. A).
3) Remove the two screws ②, then remove the PRE-AMP UNIT ③.
4) Remove the screw ④, then remove the PRE-AMP. BRACKET ⑤.
5) Remove the two screws ⑥.
6) Remove the screw ⑦, two screws ⑪ and two screws ⑩.
   Then lift up the mechanism main unit and remove it. Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws. (See Fig. B)

Note: Shape of the PRE-AMP UNIT ③ and the PRE-AMP. BRACKET ⑤ differ depending on the model.

2. Remounting

1) Mount the mechanism main unit onto the chassis with the screw ⑦, two screws ⑪ and two screws ⑩.
2) Tighten the two screws ⑥.
3) Mount the PRE-AMP. BRACKET ⑤ with the two screws ④.
4) Mount the PRE-AMP UNIT ③ and the ground lug with the two screws ② (some models are not provided with a ground lug).
5) Insert the flexible cable ① into the connector of the PRE-AMP UNIT.
6) Connect the connectors of COMPL MC-3 and COMPL HEAD BRACKET.

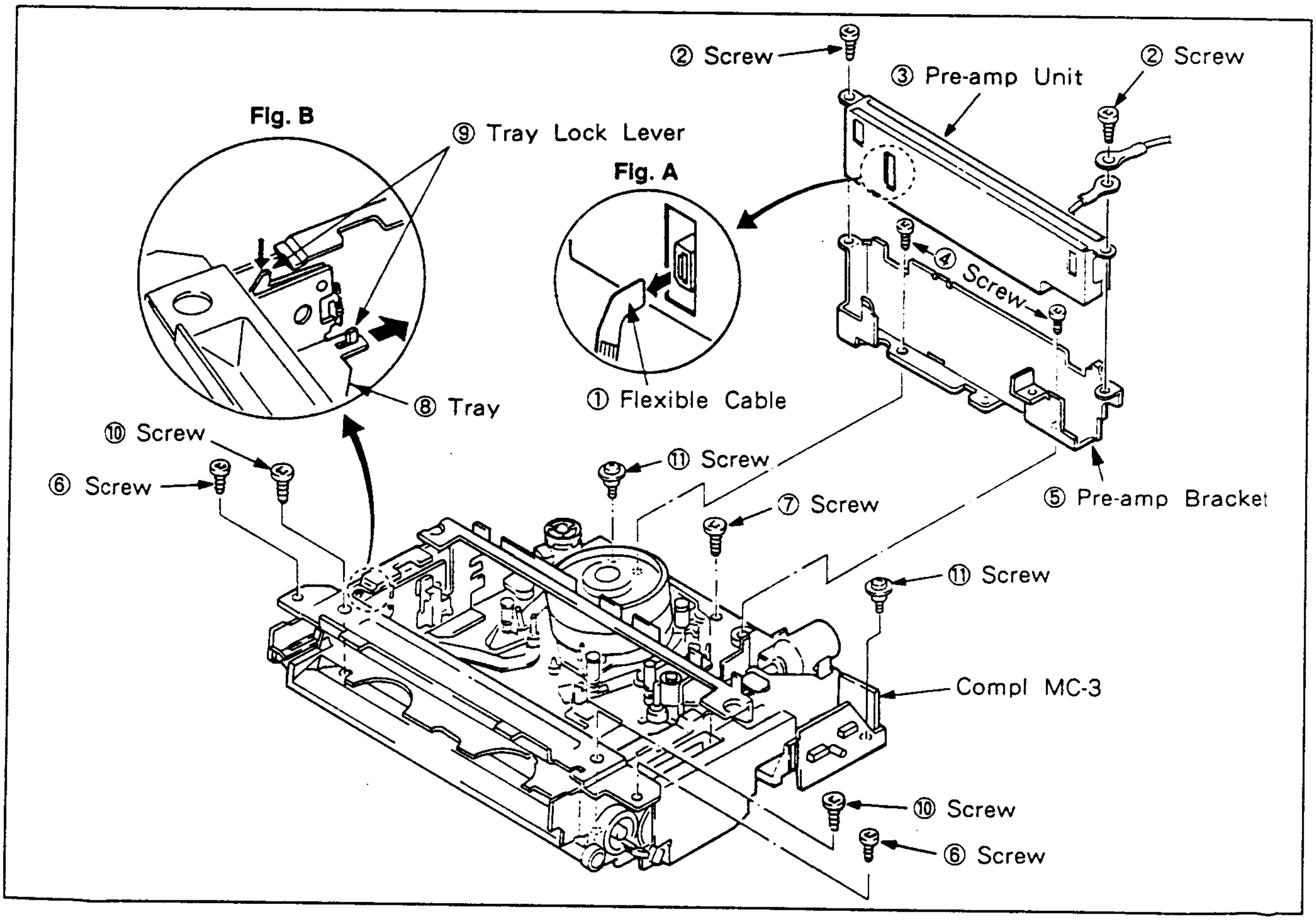

② Screw
③ Pre-amp Unit
② Screw
Fig. B
⑨ Tray Lock Lever
Fig. A
④ Screw
⑧ Tray
① Flexible Cable
⑩ Screw
⑥ Screw
⑪ Screw
⑦ Screw
⑤ Pre-amp Bracket
⑪ Screw
Compl MC-3
⑩ Screw
⑥ Screw

Fig. 5-1-1. Mechanism Main Unit

5-2. CASSETTE HOLDER MECHANISM

5-2-1. COMPL Cassette Mechanism (See Fig. 5-2-1.)

1. Removal

1) Set the video main unit to the EJECT completed mode.
2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
3) Remove the two screws ①.
4) Remove the two screws ②.
5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front (See Fig. B). When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting

1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from above, match the front loading gear hole ⑤ with the MOTOR HOLDER hole ⑥ as shown in Fig. A).
2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance.
Match positions of the FRONT LOADING GEAR △ mark ⑦ and the RACK EJECT mark ⑧.
(See Fig. A.)
4) Fix to the mechanism chassis with the two screws ②.
5) Fix to the chassis with the screw ①.
6) Connect to the various connectors.

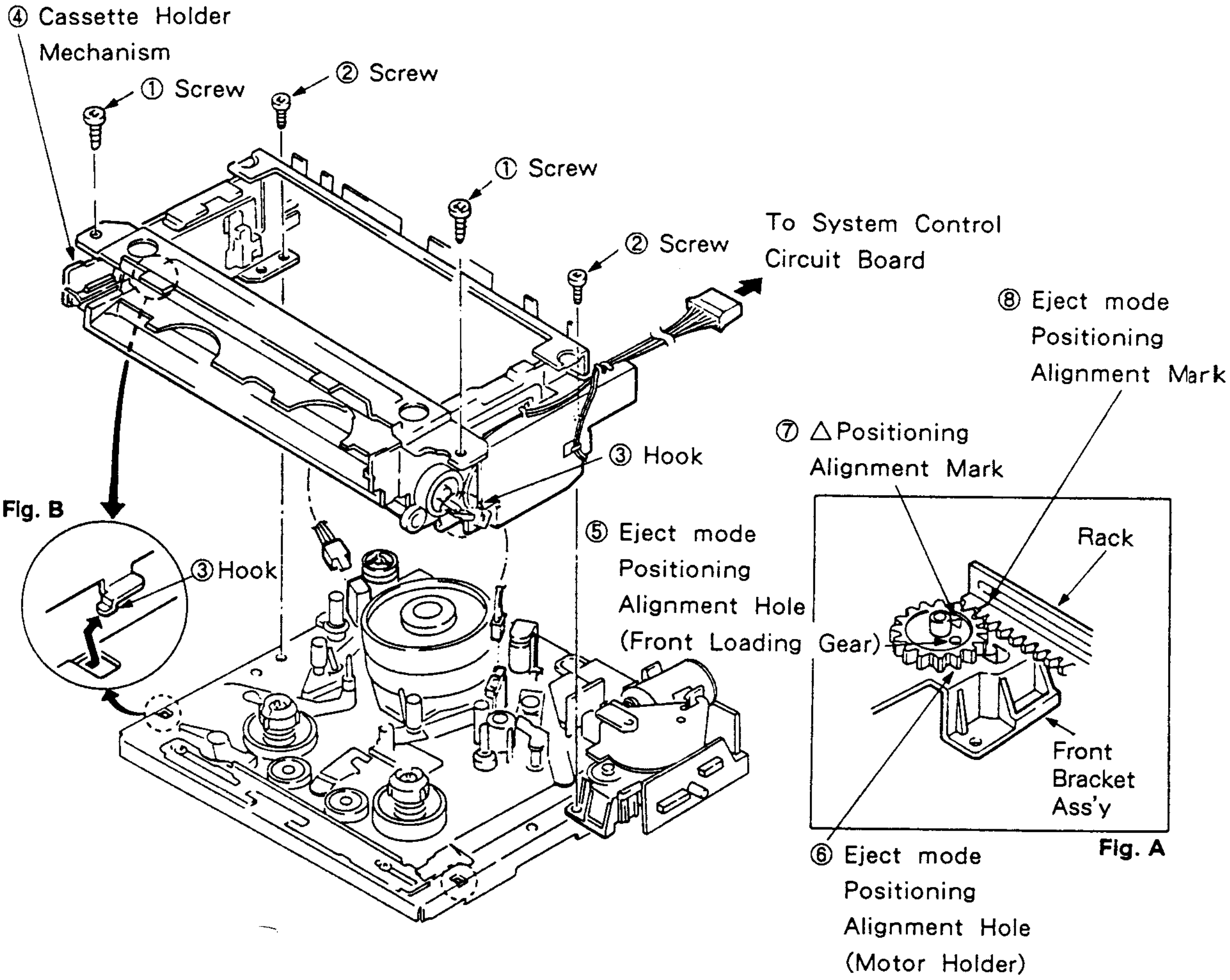

④ Cassette Holder Mechanism
① Screw
② Screw
① Screw
② Screw
To System Control Circuit Board
⑧ Eject mode Positioning Alignment Mark
⑦ △Positioning Alignment Mark
③ Hook
Fig. B
③Hook
⑤ Eject mode Positioning Alignment Hole (Front Loading Gear)
Rack
Front Bracket Ass'y
⑥ Eject mode Positioning Alignment Hole (Motor Holder)
Fig. A

Fig. 5-2-1. Compl Cassette Mechanism

5-2-3. Cassette Drive Gear (Right) (See Fig. 5-2-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in 5-2-1. and 5-2-2., respectively.
2) Remove the IDLER GEAR ①.
3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.
5) Open the hook ⑥ and remove the COUPLE GEAR R ⑦. Take care not to open the hook ⑥ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the IDLER GEAR R ⑧.

2. Remounting

1) Apply grease to gear parts that undergo friction.
2) Mount the IDLER GEAR R ⑧ onto the axle ⑨.
3) Mount the COUPLE GEAR R ⑦ onto the ROD ASS'Y axle ⑩. When doing so, match the couple gear position with the IDLER GEAR R ⑧ as shown in Fig. A.
4) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Match position to the IDLER GEAR R ⑧ as shown in Fig. A.
5) Mount the E ring ④ onto the axle ⑫.
6) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, match position to the IDLER GEAR R ⑧ as shown in Fig. A.
7) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR R ③ and the LEVER GEAR ASS'Y R.
8) Mount the IDLER GEAR ① onto the axle ⑭. When doing so, match position to the MAIN GEAR as shown in Fig. A.
9) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM ASS'Y as instructed in 5-2-2. and 5-2-1., respectively.

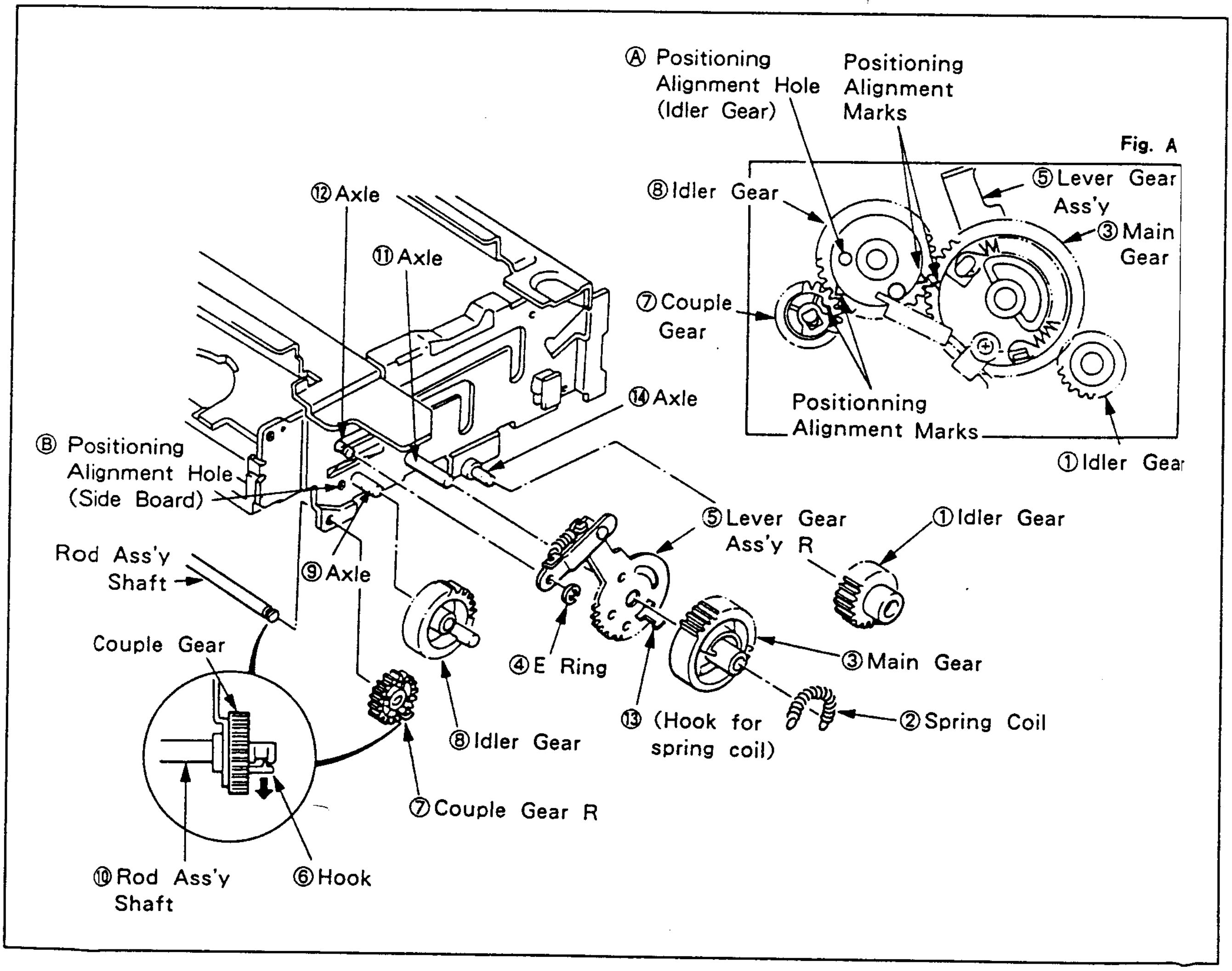

Ⓐ Positioning Alignment Hole (Idler Gear)
Positioning Alignment Marks
Fig. A
⑤Lever Gear Ass'y
③Main Gear
⑧Idler Gear
⑦Couple Gear
Positionning Alignment Marks
①Idler Gea
⑫Axle
⑪Axle
⑭Axle
Ⓑ Positioning Alignment Hole (Side Board)
Rod Ass'y Shaft
⑨Axle
⑤Lever Gear Ass'y R
①Idler Gear
Couple Gear
④E Ring
③Main Gear
⑬ (Hook for spring coil)
②Spring Coil
⑧Idler Gear
⑦Couple Gear R
⑩Rod Ass'y Shaft
⑥Hook

Fig. 5-2-3. Cassette Drive Gears (Right Side)

5-2-4. Cassette Drive Gear (Left) (See Fig. 5-2-4)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COUPLE GEAR R as instructed in 5-2-3.
3) Remove the ROD ASS'Y ①.
4) Remove the E ring ②.
5) Remove the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y ④.
7) Remove the IDLER GEAR L ⑥ and the DOOR OPEN LEVER ⑦.

2. Remounting

1) Apply grease to the axles ⑧, ⑨ and ⑩.
2) Apply grease to the IDLER GEAR L ⑥.
3) Mount the DOOR OPEN LEVER ⑦ onto the axle ⑧. Do it so that the end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.
   CASSETTE DOOR ⑪ is built in the front cabinet.
4) Mount the IDLER GEAR L ⑥ onto the axle ⑧.
5) Pass the ROD ASS'Y ① through the hole ⑫. Match position of the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig B.
6) Mount the COUPLE GEAR R as instructed in 5-2-3.
7) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
8) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Match position to the IDLER GEAR L ⑥ as shown in Fig. B.
9) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in 5-2-1.

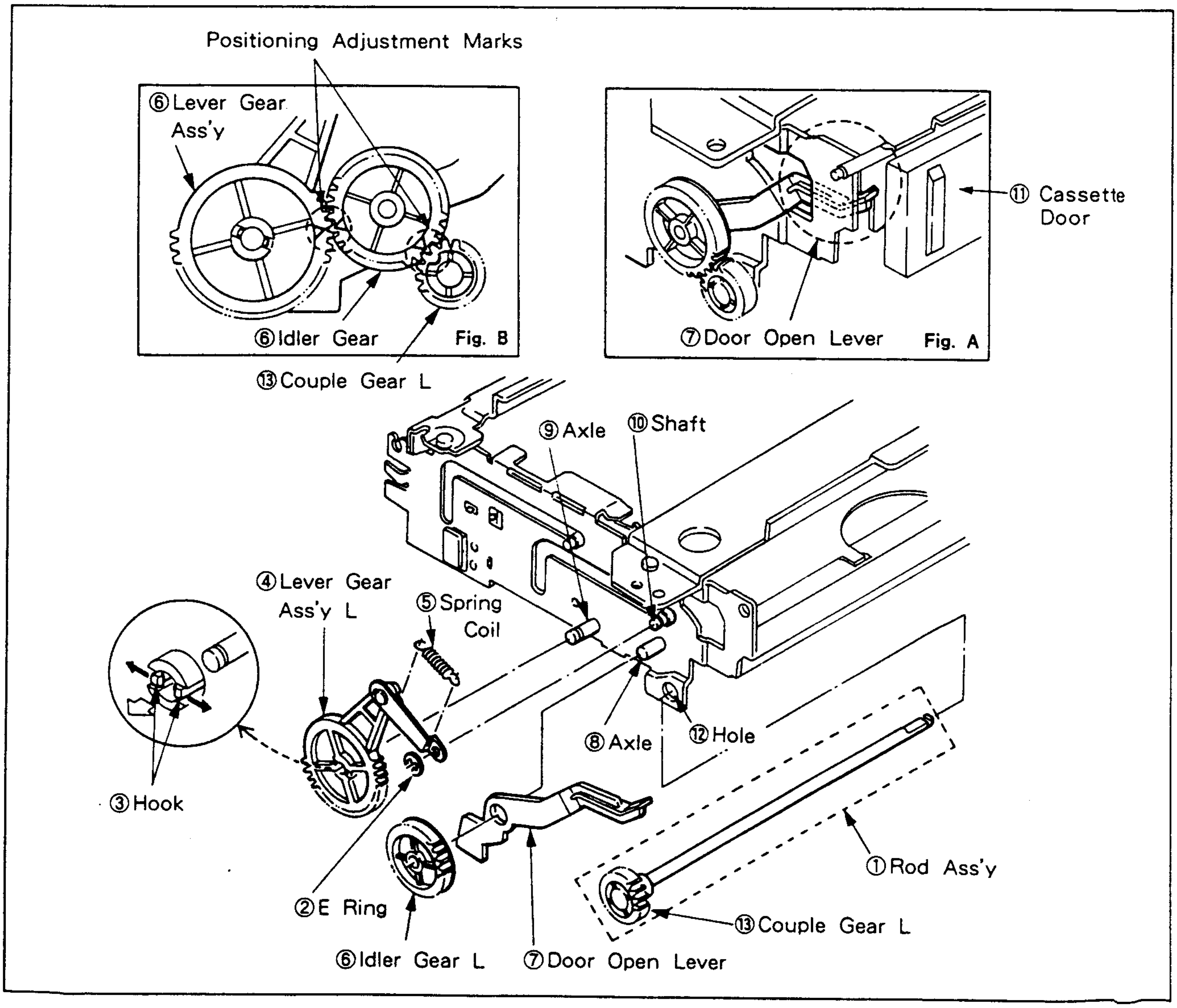

Positioning Adjustment Marks
⑥Lever Gear Ass'y
⑥Idler Gear
Fig. B
⑬Couple Gear L
⑪ Cassette Door
⑦Door Open Lever
Fig. A
⑨Axle
⑩Shaft
④Lever Gear Ass'y L
⑤Spring Coil
⑧Axle
⑫Hole
③Hook
①Rod Ass'y
⑬Couple Gear L
②E Ring
⑥Idler Gear L
⑦Door Open Lever

Fig. 5-2-4. Cassette Drive Gears (Left Side)

5-10. FIXED GUIDE, FE HEAD LEVER ASS'Y

5-10-1. Entrance side Fixed Guide, FE Lever Ass'y and Exit side Impedance Roller (See Fig. 5-10-1.)

1. Removal

1) Remove the special nut ①, Then remove the GUIDE PIPE ③ and the special washer ②, in that order.
2) Remove the SPRING COIL ⑤.
3) Remove the FTE HEAD connector.
4) Remove the special washer ⑥, then remove the FE HEAD LEVER ASS'Y ⑦.
5) Remove the screw ⑲, IMPEDANCE HOLDER ⑪ and EXIT SIDE IMPEDANCE ROLLER ⑫ with IMPEDANCE BRACKET ⑬.
6) Open the IMPEDANCE BRACKET hook ⑰ a little and remove the EXIT SIDE IMPEDANCE ROLLER ⑫.

Note: When removing and remounting the impedance roller, handle it carefulley to protect it from scratches and dirt.

2. Remounting

1) Mount the IMPEDANCE BRACKET ⑬ onto the EXIT SIDE IMPEDANCE ROLLER ⑫. Confirm that the hook ⑰ is hooked to the EXIT SIDE IMPEDANCE ROLLER ⑫.
2) Mount the EXIT SIDE IMPEDANCE ROLLER ⑫ onto the AXLE ⑭.
3) While aligning the IMPEDANCE HOLDER hole ⑯ with the protuberance ⑮, mount the IMPEDANCE HOLDER ⑪ to the DRUM BASE ⑱ with the screw ⑲.
4) After mounting the FE HEAD LEVER ASS'Y ⑦ onto the AXLE ⑧, mount the special washer ⑥.
5) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE HEAD LEVER ASS'Y hook ⑩.
6) Mount the special washer ②, the GUIDE PIPE ③ and the special nut ① to the AXLE ⑧, in that order.
7) At that time, do not excessively tighten the special nut to avoid idle rotation of the axle ribet. The height of fixing guide on the inlet side is not required.
8) Connect the connector to the FTE HEAD.

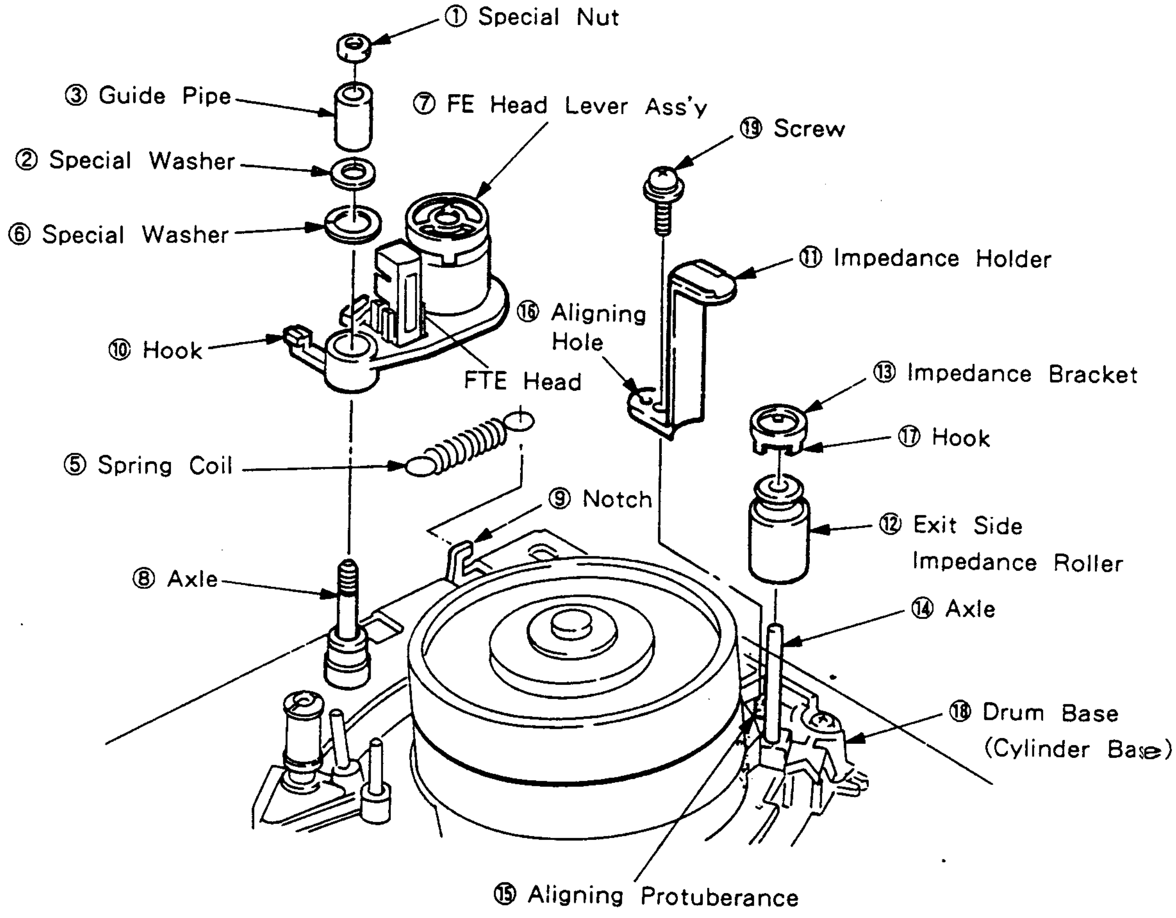

① Special Nut
③ Guide Pipe
⑦ FE Head Lever Ass'y
⑲ Screw
② Special Washer
⑥ Special Washer
⑪ Impedance Holder
⑯ Aligning Hole
⑩ Hook
FTE Head
⑬ Impedance Bracket
⑰ Hook
⑤ Spring Coil
⑨ Notch
⑫ Exit Side Impedance Roller
⑧ Axle
⑭ Axle
⑱ Drum Base (Cylinder Base)
⑮ Aligning Protuberance

Fig. 5-10-1. Entrance side Fixed Guide, FE Lever Ass'y and Exit side Impedance Roller

5-10-2. Entrance side Impedance Roller and FTE Head (See Fig. 5-10-2.)

1. Removal

1) Remove the FTE HEAD ① connector.
2) Open the hook ② a little, then remove the IMPEDANCE BRACKET ④.
3) Remove the special washer ⑧, then remove the ENTRANCE SIDE IMPEDANCE ROLLER ③.
4) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note: Take care not to open the hook too much, otherwise it may be deformed or broken.

2. Remounting

1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
2) Mount the ENTRANCE SIDE IMPEDANCE ROLLER ③ onto the AXLE ⑦, then mount the special washer ⑧.
3) Mount the IMPEDANCE BRACKET ④ onto the ENTRANCE SIDE IMPEDANCE ROLLER ③. Confirm that the hook ② is hooked to the ENTRANCE SIDE IMPEDANCE ROLLER ③.
4) Connect the connector to the terminal of the FTE HEAD ①.

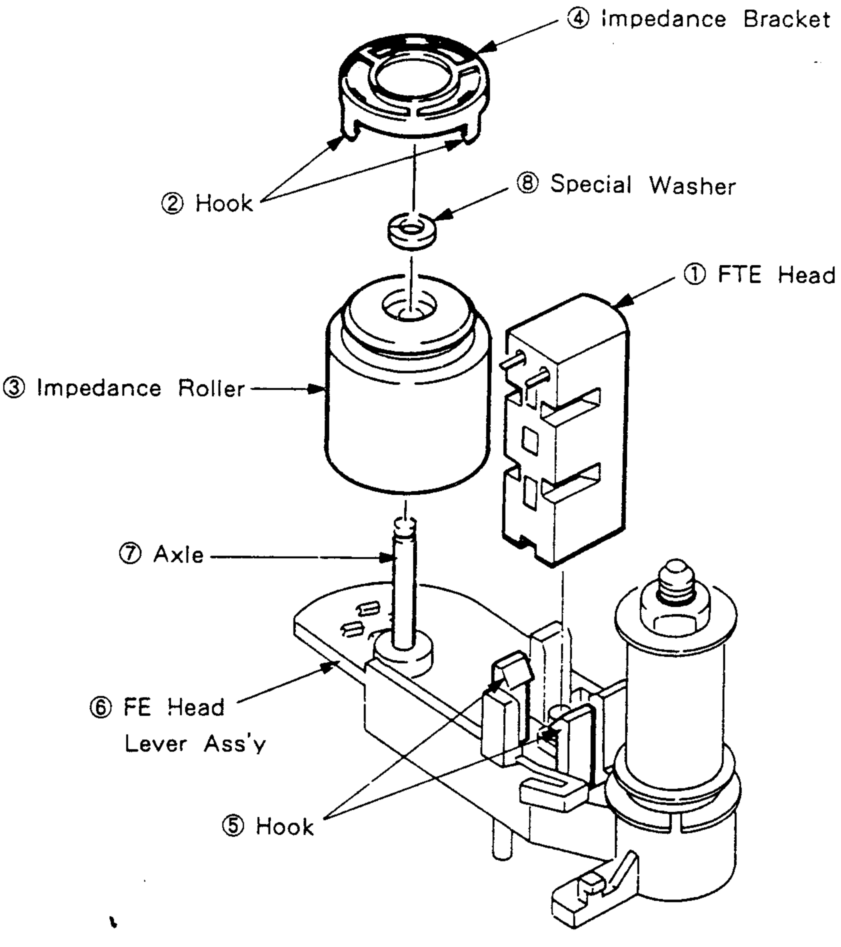

④ Impedance Bracket
② Hook
⑧ Special Washer
① FTE Head
③ Impedance Roller
⑦ Axle
⑥ FE Head Lever Ass'y
⑤ Hook

Fig. 5-10-2. Entrance side Impedance Roller and FTE Head